A XXth Century Commercial
Social & Biographical Review

PRO REGE ET LEGE

LEEDS

CONTEMPORARY Sketches and Reviews

Industries and Institutions
DESCRIBED.


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OLD ROUNDHAY COLLECTION

LEEDS.

CONTEMPORARY

SKETCHES & REVIEWS.

ILLUSTRATED.

TRADES, INSTITUTIONS & PROMINENT MEN.

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Rt. Hon. Wm. Lawies Jackson,
J.P., P.C., F.R.S.

M.P. for Northern Division of Leeds since 1880. Chief Secretary for Ireland 1891-92. Leeds residence: Allerton Hall, Chapel Allerton.

From a Photo by Byrne & Co., Richmond, Surrey.

Sir John Barran,

M.P. for Leeds, 1876-85, and for the Otley Division of the West Riding of Yorkshire, 1886-95; Mayor of Leeds, 1870-72. Head of the firm of John Barran & Sons. Leeds residence: Chapel Allerton, Leeds.

From a Photo by Rosemont, Leeds.

Sir James Kitson, Bart.

M.P. for the Colne Valley Division of the West Riding of Yorkshire since 1892. Lord Mayor of Leeds 1896-97. President of Iron and Steel Institute 1888-90. Leeds residence: Gledhow Hall.

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Ernest Wm. Beckett, Esq., M.P.

for the Whitby Division of Yorkshire since 1885. Partner in Beckett & Co., Bankers, Leeds.
Hon Col. Yorkshire Hussars.
Leeds residence: Kirkstall Grange.

LEEDS

Sketches and Reviews.

LIKE in the diversified range and number of its various industries and mercantile activities, as in wealth, population and municipal progress, Leeds must necessarily rank as one of the most important of our Provincial Commercial Centres, exhibiting as it does on every hand, evidence of the spirit of modern enterprise that has supplied the basis of British trade supremacy, and that has contributed to the building up of the mighty Empire upon which, it is the Englishman's proud boast,

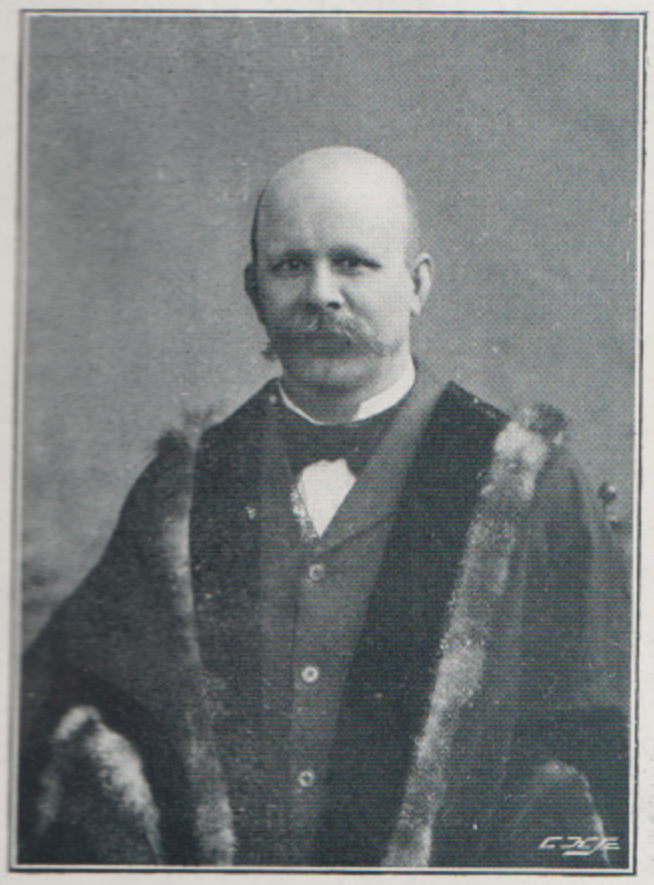
From a Photo by THE TOWN HALL. *Jos. Wormald, Leeds.*

the sun never sets. In reviewing the present-day aspect of the great Yorkshire Metropolis, a brief reference only is necessary to a past by no means devoid of historic interest, which would however more closely concern the antiquarian or student of archæology, than the business man requiring up-to-date information on the representative firms and principal manufactures of the City and its environs.

Although bearing few existing traces of its undoubted antiquity, Leeds was at a very early period a place of some considerable importance, especially in connection with its present staple industry, which has been its chief business for centuries, as evidenced in an extract from Lord Clarendon's History, dated 1642, wherein, speaking of Leeds, Bradford and Halifax, he describes them as "three very populous and rich towns, depending wholly on clothiers."

From a Photo by THE GRAND STAIRCASE IN MUNICIPAL OFFICES. *Jos. Wormald, Leeds.*

Within the past thirty years almost all traces of the mediæval town, of which not a few of the quaint old buildings then existed, have disappeared, and in their place have been erected handsome modern structures, and numberless improvements in the thoroughfares bear witness to the enterprise both of the Corporation and of the private property owners of the City, notably those effected in new Briggate and Upperhead Row, Duncan Street, Boar Lane, Swingate, Kirkgate and The Calls.



From a Photo by *Rosemont, Leeds.*

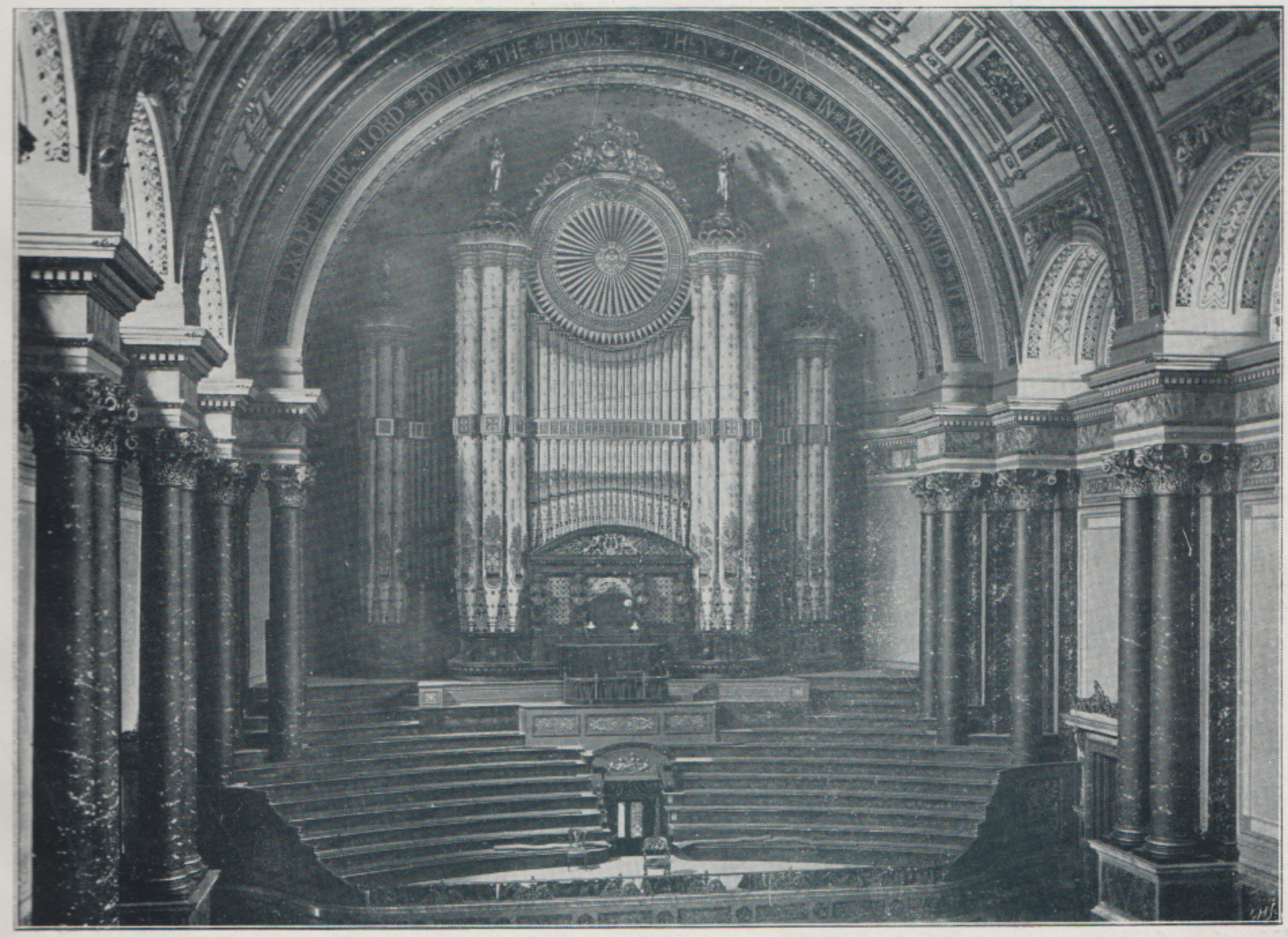
Ald. JOHN GORDON, J.P.,

Lord Mayor of Leeds 1899-1900.

By profession an Accountant. For many years one of the most active workers in the Municipal body. Residence: Adel, near Leeds.

MUNICIPAL AND PUBLIC BUILDINGS.

Prominent amidst the architectural features of modern Leeds is the magnificent TOWN HALL, erected 1853-58, in Victoria Square, and opened by Her Majesty Queen Victoria in the month of September of the latter year. This noble structure, in the Classic Style, forms a parallelogram of 250 feet by 200 feet, and stands on an elevated platform surrounded by Corinthian columns and pilasters which support an entablature and attic rising to a height of 65 feet. The principal façade has a deeply recessed portico of ten columns, forming the chief entrance, and approached by a flight of steps, 135 feet in length, with a pedestal at each corner, upon which four massive sculptured Lions were placed in 1867. The Great Hall (Victoria) is of noble proportions 162 feet by 72 feet, and 75 feet in height) and ranks as one of the largest in the kingdom, providing as it does, accommodation for an audience of 8,000 persons. At the North end is the great organ, one of the finest in England (50 feet in height and of similar width) fitted with hydraulic engines for blowing. The structure is crowned by a lofty tower—a domed square structure—rising to a height of 225 feet from the ground level. At the north end of the building



From a Photo by THE VICTORIA HALL (TOWN HALL). *Jos. Wormald, Leeds.*

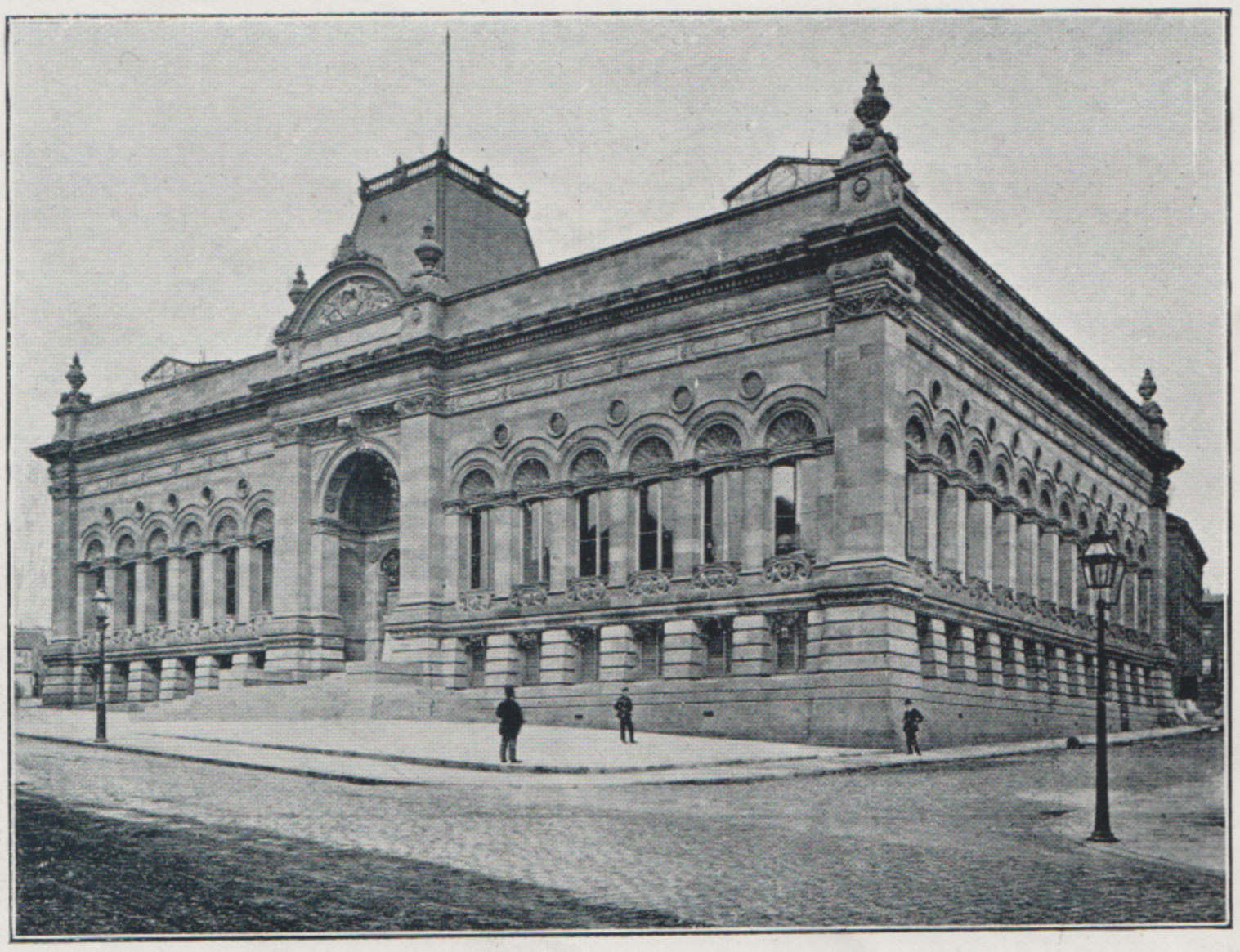
are the Law Courts, used for Assizes; and the Borough Court and Council Chamber at the south end.

From a Photo by THE MUNICIPAL OFFICES. *Jos. Wormald, Leeds.*

In the vestibule are marble statues of H.M. the Queen, and of the late Prince Consort. Conspicuous in the front of the building are statues of the late Duke of Wellington and Sir Robert Peel, and a fountain of imposing proportions.—*Illustrated on page* 3 *and* 5.

The Municipal Offices (foundation stone laid on October 14, 1878, and opened in 1883) and the offices of the School Board are in Calverley Street, of which the whole of the southern side is taken up by the Free Library, the latter building also comprising a splendid reading room, a sculpture gallery, the various picture galleries, and a large inner hall with glass roof and open arcades, the collection housed therein including many excellent pictures and articles of *vertu*.—*Illustrated on page* 4 *and* 6.

Another handsome and imposing edifice is **The Coliseum,** situated in Cookridge Street and Portland Crescent, which was opened in 1885, by T.R.H. the Prince and Princess of Wales. The building, designed in an early form of the Gothic Style with stone frontages, covers an area, of some 14,000 square feet, and includes a great hall, one of the largest in the North of England, possessing seating capacity for 3,100 persons and adapted with every



From a Photo by THE LEEDS INSTITUTE. *Jos. Wormald, Leeds.*

modern convenience for the holding of high-class concerts and other entertainments, public

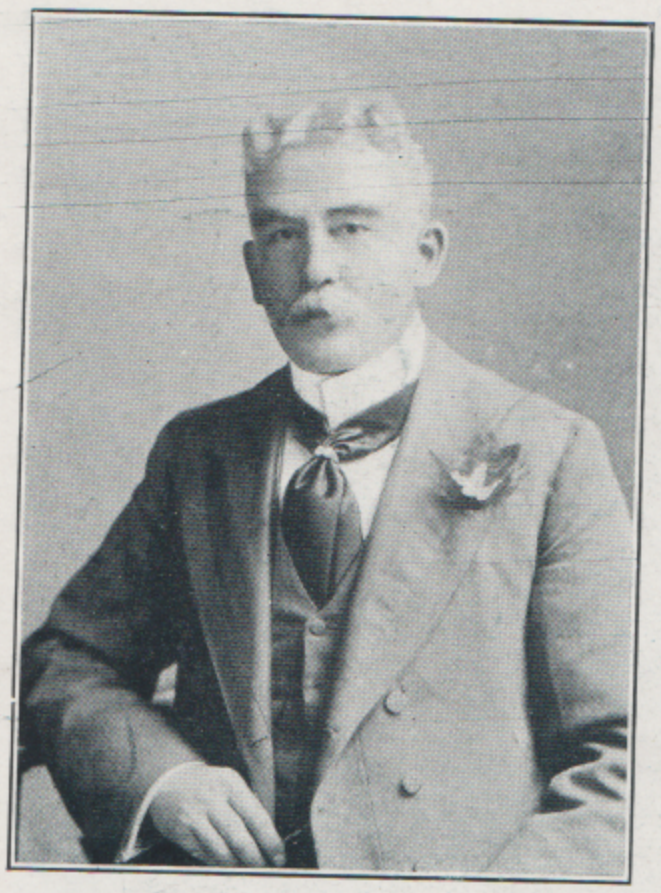
From a Photo by THE YORKSHIRE COLLEGE. *Jos. Wormald, Leeds.*

gatherings, &c. At the western extremity of the hall is a grand organ, built by Mr. D. Abbott of Leeds; the building is lighted throughout by electricity and ample precautions have

From a Photo by THE INFIRMARY. *Jos. Wormald, Leeds.*

been taken to avoid panic, and to ensure safety of egress for the audience under any conditions that might arise.

The Royal Exchange situated at the end of Boar Lane is a fine structure in the Perpendicular Gothic Style, with frontages also to Park Row and Basinghall Street, and is crowned with a tower and spire rising to a height of 118 feet.



From a Photo by J. Bacon & Sons, Leeds.

Ald. ALF. COOKE.

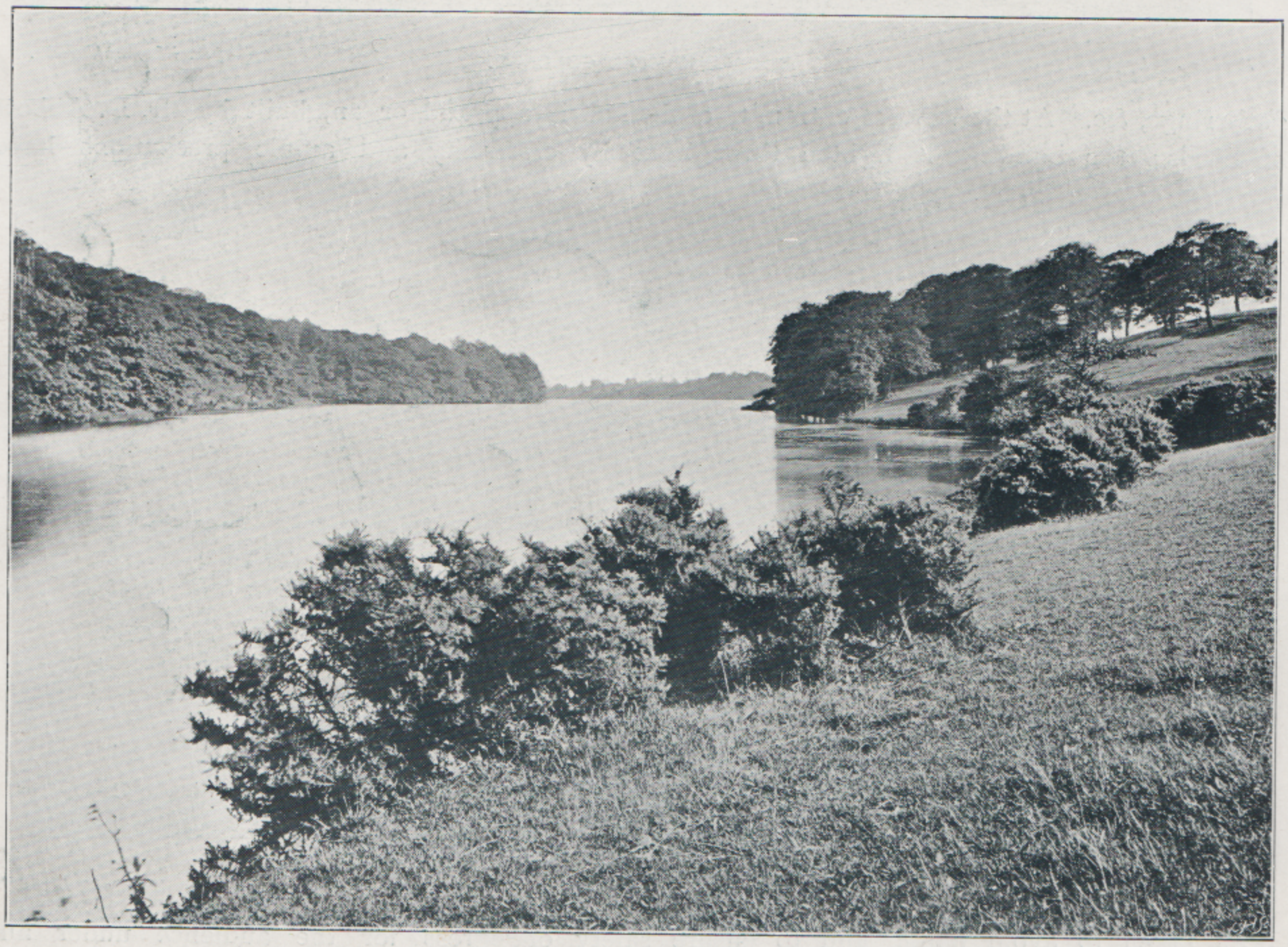
Was Mayor of Leeds for the year 1890-91. Is the proprietor of the well known Color-Printing business "The Crown Works." For many years one of the most active members of the Leeds Corporation.

The Public Markets in Kirkgate occupy the site of the ancient "Vicars Croft" and the Historic Vicarage, and comprise large Covered Markets and adjoining Fish and Vegetable Markets. There is also the South or Leather Market, situated between Hunslet Lane and Meadow Lane, and this forms an important centre of trade, eight

From a Photo by Rosemont, Leeds.

J. HEPWORTH, Esq., J.P.

A late Alderman of the City and late Chairman of the Library Committee. Is the head of the well known firm of Clothiers, Joseph Hepworth & Son, Ltd.



From a Photo by

WATERLOO LAKE, ROUNDHAY PARK.

Jos. Wormald, Leeds.

fairs being held annually. The Victoria Cattle Market and Abattoir was erected in 1886, and is conveniently situated at the junction of Whitehall and Gelderd Roads.

Leeds has just reason to be proud of her splendid Medical and Charitable Institutions, of which **The General Infirmary** is the oldest and most important. It was originally established

From a Photo by THE GLEN, ROUNDHAY PARK. *Jos. Wormald, Leeds.*

in 1767 in a yard off Kirkgate, and was removed in 1791 to the top of King Street. The present building erected 1863-8, at a cost of upwards of £100,000, stands on a commodious site near St. George's Church, Great George Street, and is a fine structure of brick with stone dressings in the early Gothic Style, designed on the "Pavilion" principle, and with the addition of the new wing, (opened in 1892), affords accommodation for 400 In-Patients,

with every convenience for the Medical and Nursing Staff, and the work of the Out-Patient department. (*Illustrated on page 7*).

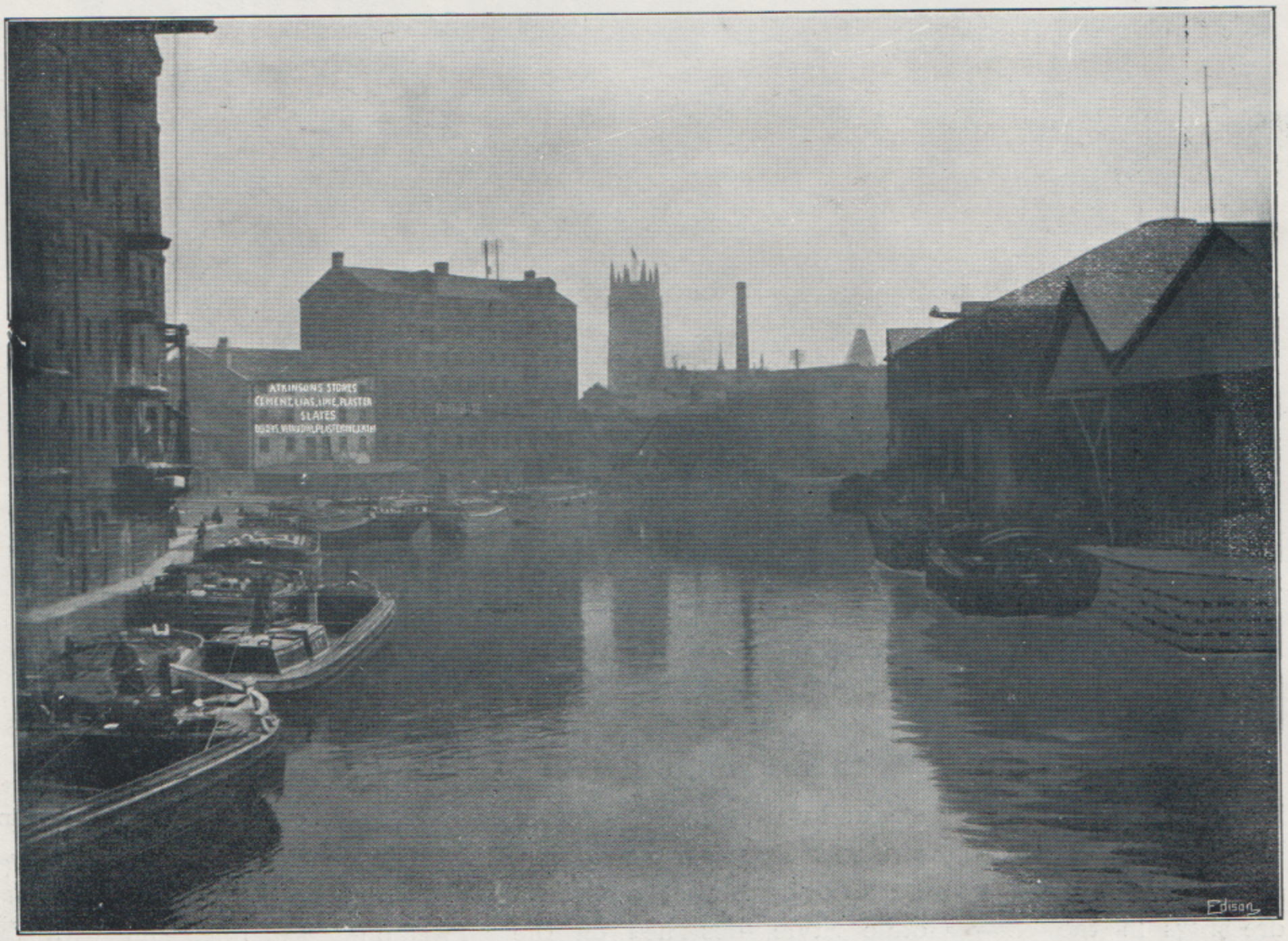
From a Photo by *Rosemont, Leeds.*

Ald. C. F. TETLEY, J.P.

Lord Mayor 1897-98, is a member of the well known firm of Brewers: Joshua Tetley & Son, Limited. Takes an active part in all movements to promote the interests of the City of Leeds.

Ample provision is also made for the treatment of general and special cases at the Hospital for Women and Children, the Leeds Public Dispensary and the various Institutions established both by private beneficence and by the Municipal Authorities.

In the forefront of Leeds Educational Institutions is the **Yorkshire College,** constituted in 1874, and three years later affiliated to Victoria University, Manchester. The buildings, erected at a cost of upwards of £120,000, contain Chemical and other minor Laboratories, Lecture Theatre (seating 400 students), Rooms for the study of Organic and Physical Chemistry, Biological Lecture Room and Laboratories, Museum, and all the requisite offices for the administrative and teaching staff. Other portions of the building are occupied by the departments of Technical Instruction, including Practical Engineering and cognate subjects; and the splendidly equipped Art and Textile Sections, built and furnished by the Worshipful Company of Clothworkers at a cost of nearly £35,000. (*Illustrated on page 7*).



From a Photo by THE QUAYS. *Rosement, Leeds.*

From a Photo by Rosemont, Leeds.

Col. T. W. HARDING, J.P. Lord Mayor 1898-99, is a member of the firm of Harding, Richardson, Rhodes & Co., Limited, Engineers to the Textile trades. Colonel of Leeds Artillery Volunteers.

The Grammar School founded in 1552 and after many changes of location, the foundation stone of the present edifice, situated in Moorland Road and Clarendon Road, facing Woodhouse Moor, was laid on April 6th, 1858. It is a handsome pile of buildings covering (with play grounds) about eight acres of land, and comprises two large Class or Lecture Rooms, a large School Room 95 feet by 28 feet, Library, Chemical Laboratory and Lecture Room, Class Rooms, &c., to which were added in 1863 an elegant detached Chapel. (*Illustrated on page* 16).

The School Board has at present some 60 Schools under its control, and provides accommodation for nearly 60,000 scholars.

The Leeds Institute in Cookridge Street was originally established 1825 at the back of Park Row, when it was known as the Mechanics' Institute. The present building is of massive proportions and in the Italian Style. The Leeds School of Art, worked in connection with the Science and Art Department at South Kensington, is located within the building, and a prominent feature of the Institute is the Lectures given in the winter season by eminent Scientists on popular subjects. (*Illustrated on page* 6).

The Corn Exchange in its present position was erected in 1863. An older structure that preceded it was situate at the top of Briggate, on a site recently covered by handsome buildings and shops that have greatly improved this locality. The present

From a Photo by HUNSLET SWING BRIDGE. *Jos. Wormald, Leeds.*

building is in the form of a huge Dome, and faces Duncan Street. (*Illustrated on page* 16).

The Leeds Quays. At the foot of Lower Briggate is the Leeds Bridge from which the river, albeit murky in hue, presents, with the large warehouses on its Quays and the busy tugs straining at the tow-lines connected with laden barges, at all seasons an aspect of great activity. (*Illustrated on page* 10).

Hunslet Swing Bridge is one of the largest Swing Bridges in existence, crossing the River Aire, the Aire and Calder Canal and the public roadway, the length between abutments

From a Photo by THE PARISH CHURCH—ST. PETER'S. *Jos. Wormald, Leeds.*

is 275 feet with a clear span over the waterway of 170 feet. The two main girders are 295 feet in length and about 30 feet in depth, the weight of the steel work being about 1,250 tons. The bridge was built by the Cleveland Bridge and Engineering Company of Darlington. *Illustrated on page* 11).

The new line of Railway and Goods Station at Hunslet, to serve which the Hunslet Swing Bridge was constructed, is an inestimable convenience to the large works and heavy traffic of the East, North East, and South East Districts of the City of Leeds.

The Yorkshire Penny Bank stands in Infirmary Street, at the rear of the General Post Office. It is a handsome stone structure and worthy of a more prominent site. (*Illustrated on page* 19).

The Yorkshire Banking Co.'s Bank is situate at the commencement of Boar Lane and faces the General Post Office. It is one of the most handsome buildings in the City of Leeds. (*Illustrated on page* 19).

The Swimming Bath – The new Bath was erected in 1900. It is in Cookridge Street, of large dimensions and like most of Leeds Institutions admirably managed. The water supply is ample, and it will suffice to say, of a quality, for purity and softness, met with in very few places. (*Illustrated on page* 17).

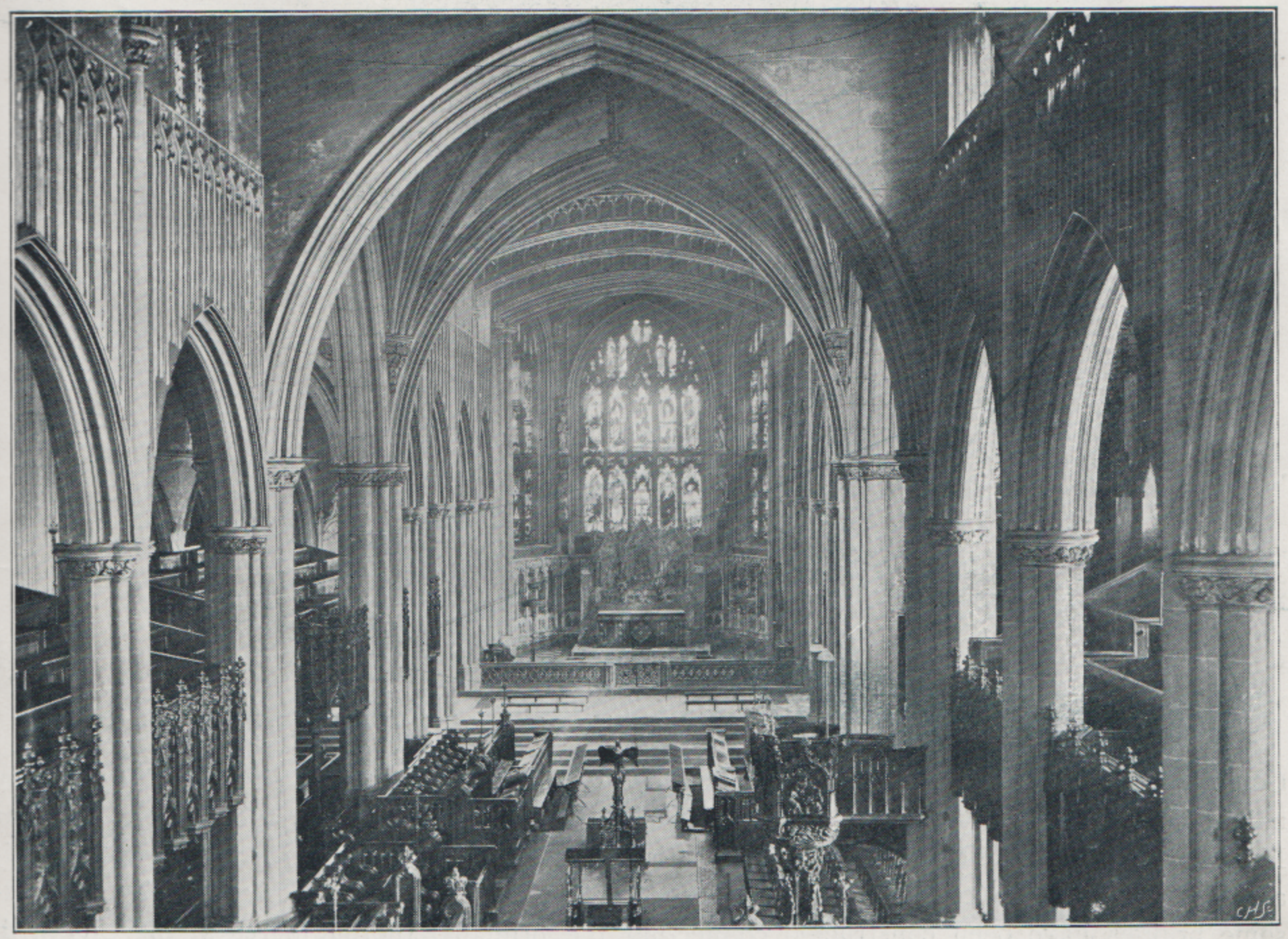
From a Photo by *Rosemont, Leeds.*

Rev. EDGAR CHARLES SUMNER GIBSON, D.D.

Vicar of Leeds and Rural Dean since 1895. Distinguished writer on Theological Subjects. Leeds address : The Vicarage.

The Parish Church (St. Peter's) stands on the site of a more ancient edifice that was demolished in 1838. The old church is referred to in Domesday Book. The present structure, although smoke blackened ontside, is handsome and commodious within. Its dimensions are 180 by 86 feet, with a tower 139 feet in height, in which is a peal of 13 bells of remarkable tone and sweetness. The interior presents to the visitor a striking contrast to the dulness of the exterior. The Chancel is very beautiful, it is approached by seven steps and at the Altar is low open stone screen work. About the Altar is a Corregio painting representing "Christ's Agony in the Garden." The Church possesses seats for 3,000 people of which more than one half are free. (*Illustrated on pages* 12 *and* 13).

The Church of St. John the Evangelist is the oldest Church in Leeds, it was consecrated on the 12th October, 1634. It presents no particular features of archi-

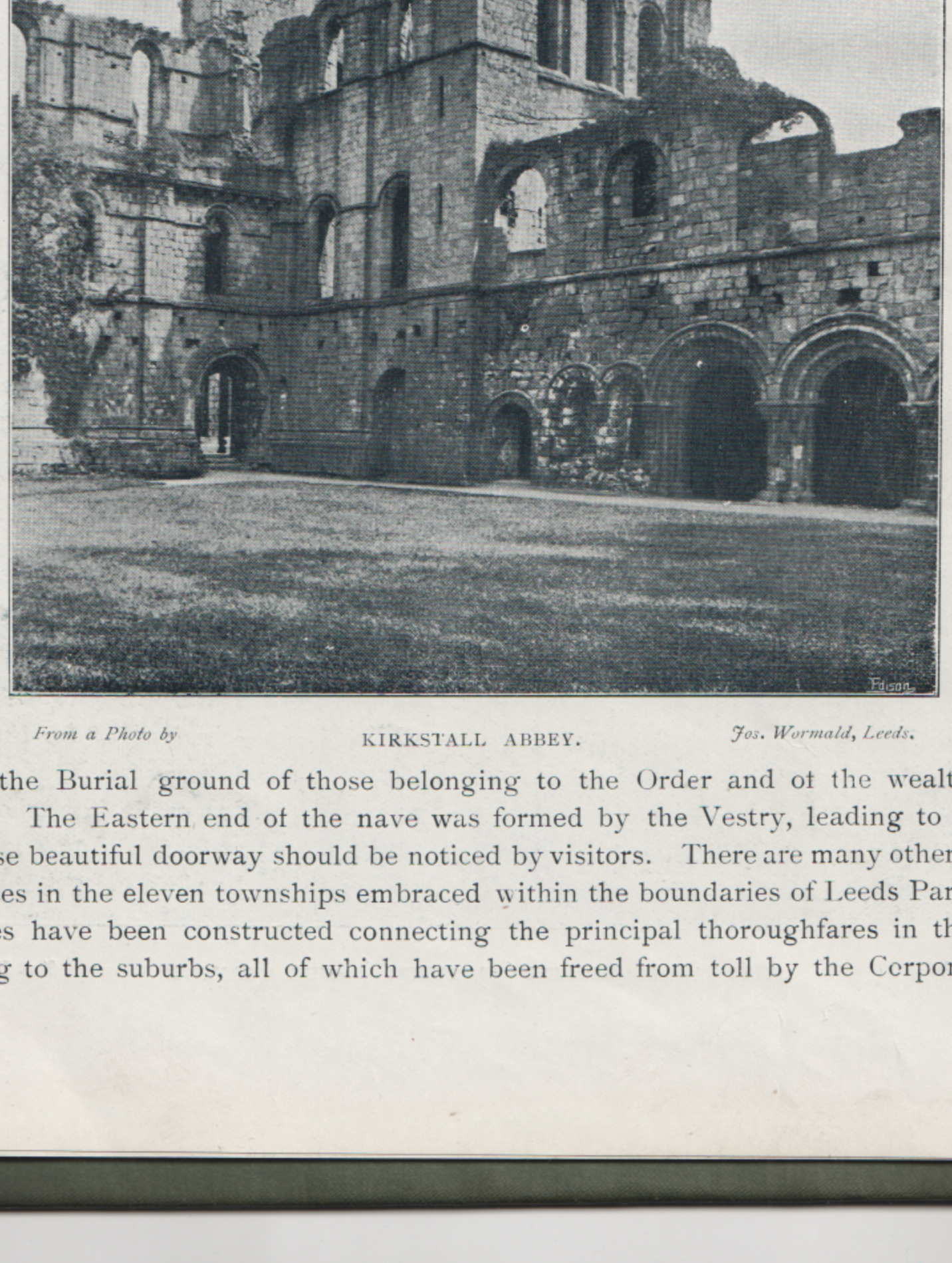


From a Photo by THE PARISH CHURCH (ST. PETER'S)—THE CHANCEL. *Jos. Wormald, Leeds*

tectural beauty, but it is a large building, and is, owing to its antiquity and its records, of special interest to many Leeds Citizens. (*Illustrated on page* 18).

Kirkstall Abbey.—A stately ruin surrounded by pleasant grounds and adjoining the River Aire, presented to the City by the late Col. North. (*Illustrated on pages* 14 *and* 15).

The Electric car service sets down passengers in front of the Abbey (about 20 minutes run from Briggate) and band performances are given in the grounds during the summer season. Amongst the most picturesque of the ruins and in the best state of preservation is the Nave, south of which is the Cloister Court, into which opened the monks' apartments. The Cloister

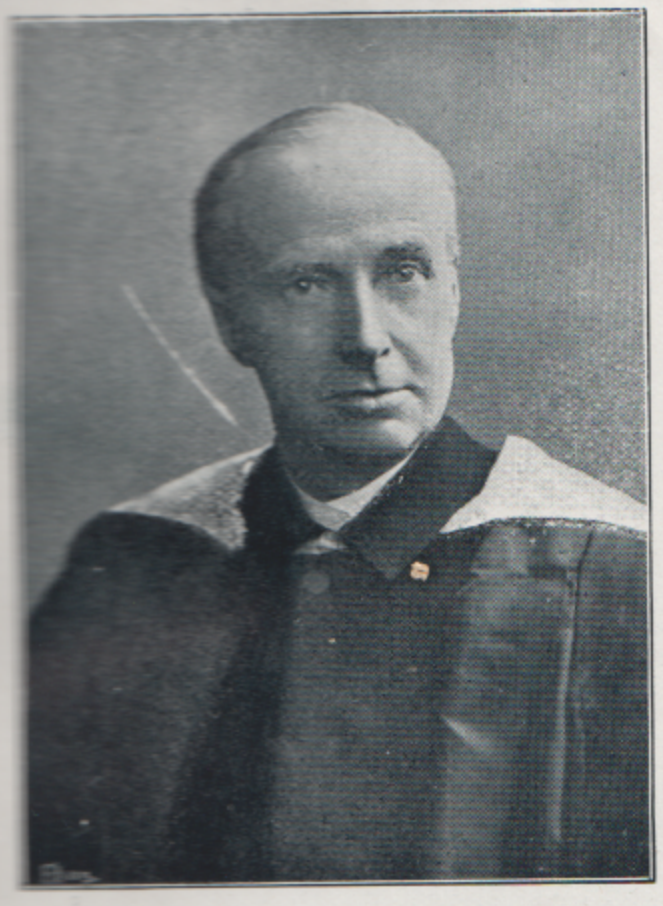


From a Photo by KIRKSTALL ABBEY. *Jos. Wormald, Leeds.*

Court was the Burial ground of those belonging to the Order and of the wealthiest of the neighbours. The Eastern end of the nave was formed by the Vestry, leading to the Chapter House, whose beautiful doorway should be noticed by visitors. There are many other fine ecclesiastical edifices in the eleven townships embraced within the boundaries of Leeds Parish. Handsome bridges have been constructed connecting the principal thoroughfares in the City with those leading to the suburbs, all of which have been freed from toll by the Corporation.

The Town Council have also acquired the Tramway System within the municipal boundaries. The cars are elegant and roomy; the rate of progression as rapid as is consistent with the public safety, and the fares most moderate. The principal lines of route are from Roundhay Park to Kirkstall Abbey, some five miles in length without a change, and from Chapeltown to Far Headingley, a similar distance.

In the provision made for the outdoor recreation of its inhabitants, Leeds possesses in Roundhay Park the finest open space of the kind in the country. It contains 773 acres, including two fine lakes, the



From a Photo by *Rosemont, Leeds.*

Rev. CHAS. HARGROVE, M.A.

An eminent Unitarian Divine who has officiated for over 20 years at the Mill Hill Unitarian Chapel. Selected as Delegate from England to attend the Unitarian Conference in 1900 at Boston, U.S.

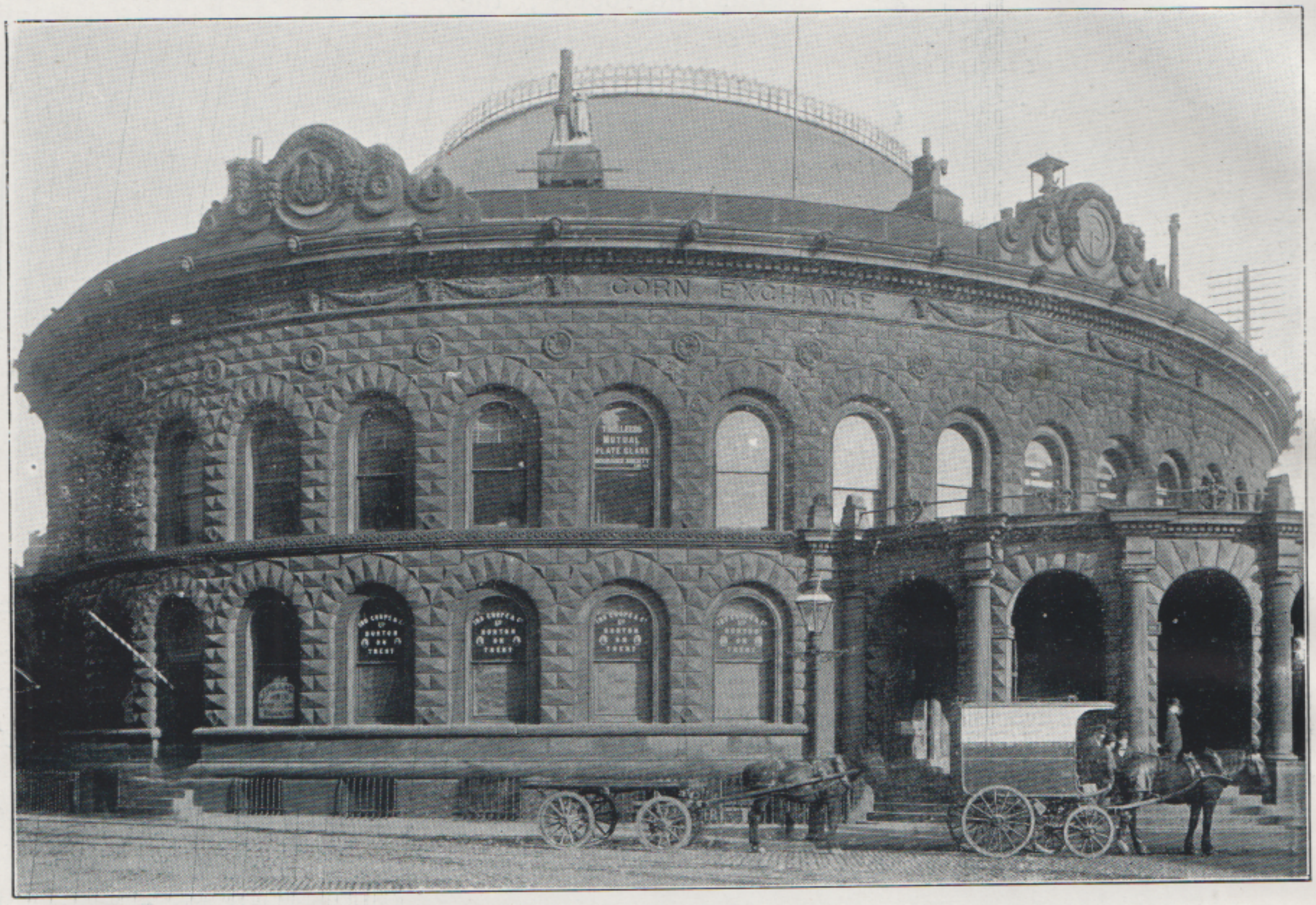
From a Photo by *Rosemont, Leeds.*

GROSVENOR TALBOT, Esq., J.P.

A well known member of the Leeds School Board and connected with some of the principal Leeds Companies Residence: Southfields, Burley, near Leeds.

From a Photo by KIRKSTALL ABBEY—THE NAVE LOOKING EAST. *Jos. Wormald, Leeds.*

larger of which is 35 acres in extent. For the splendour of its woodland and beautifully timbered slopes, commanding a prospect of 20 miles, this park has no equal in this



From a Photo by THE CORN EXCHANGE. *Jos. Wormald, Leeds.*

part of England. (*Illustrated on pages* 8 *and* 9.) Additional open spaces provided for the public are Woodhouse Moor (63 acres), Woodhouse Ridge, Hunslet Moor, Pasture Hills, Armley, and other smaller grounds; while in the ancient ruins of Kirkstall Abbey and its charming and picturesque surroundings, the residents of the Borough were presented with a unique gift by the late Colonel North, who was a native of the city of Leeds.

From a Photo by THE GRAMMAR SCHOOL. *Jos. Wormald, Leeds.*

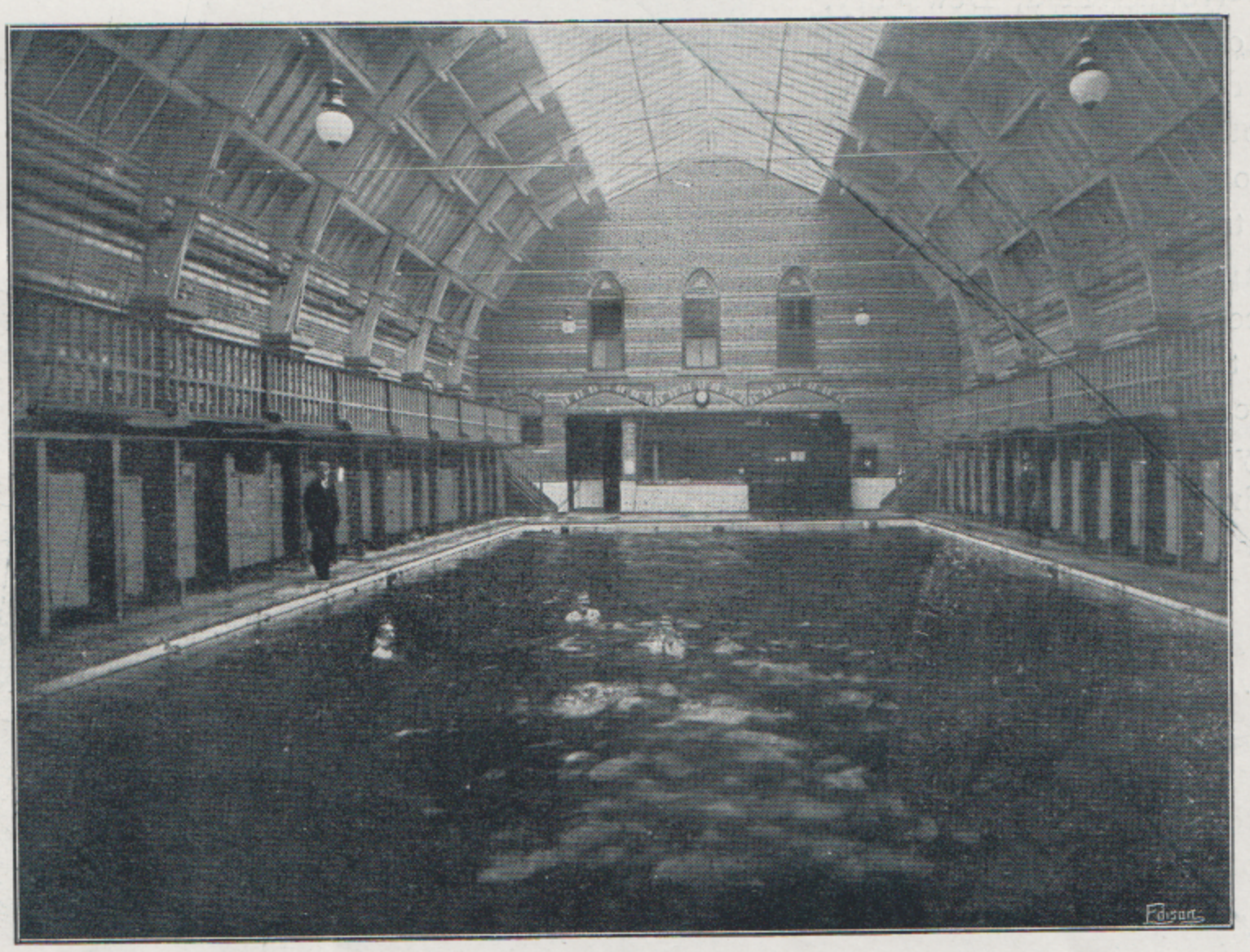
Railway communication exists with the Midland, the North Eastern, the London and North Western, the Great Northern, and the Great Central systems, both for passengers and goods, and there are Goods Stations at Wellington Street, Hunslet Lane, and Marsh Lane. The City is also well served by its waterways. The Aire and Calder Navigation serving the East Coast, and the Leeds and Liverpool Canal the West Coast. As illustrating the

remarkable Mercantile and Municipal developments accomplished within the half century just closed, we may place in comparison the figures of the rateable value of the Borough, which, in 1851 was £420,000, and in 1898 (the last return available) had risen to £1,520,000, or nearly quadrupled in that period.

From a Photo by *Rosemont, Leeds.*

HENRY JOHN PALMER, Esq., J.P.
Managing Editor of the Yorkshire Post and affiliated papers: Sub-Editor, and Assistant Editor of the Sheffield Daily Telegraph, 1878-86; Editor of the Birmingham Daily Gazette, 1886-90. Leeds Residence: Newton Priory.

The general aspect of the City from its southern approach, is that of a busy hive of strenuous workers, while the visitor entering from the north, is at once struck with the diversified and almost panoramic range of views, reminiscent at times of the Lake District or the scenery of Scotland. The southern portion of the City including Hunslet and Holbeck, is essentially the workshop of Leeds, and in this neighbourhood has unquestionably been the fountain source of its industrial wealth and prosperity. Here are grouped the great enterprises that have brought to their owners world-wide fame wherever British trade has "followed the Flag," and in their various undertakings have so largely increased the commercial prestige of the Capital of the West Riding. Of the first importance in its bearing on the evolution of modern Leeds, must be placed the vast Textile Industry, which practically took its rise in the last quarter of the Eighteenth Century. At that time Leeds was busily occupied in a double capacity, the Wars of the French Revolution between 1790 and 1802, leading to great activity at the Low Moor foundries, where cannons were cast, while the manufacturers of cloth were



From a Photo by THE SWIMMING BATH. *Rosemont, Leeds.*

kept busily engaged upon Army cloths and blankets. This led to the introduction of steam power, the spindle and the jenny. The last of the old hand-spun and hand-worked cloth manufacturers,

Mr. Armitage (who died in 1818), was a pioneer in replacing the old order by the new. He introduced improved machinery and appliances in place of the previous primitive methods of manufacture; a revolution not effected without considerable disturbance, as witnessed in the Luddite riots, and the lengthened strikes which retarded the march of Industry, and greatly impoverished the workers. With the gradual introduction of the Power loom and the adoption of improved machinery, the old system of domestic manufacture speedily vanished, giving place to the rapid methods of production now in force, the actual revival dating from the Great London Exhibition of 1851, when the cloth firms

From a Photo by ST. JOHN'S CHURCH. *Jos. Wormald, Leeds.*

of Leeds secured a substantial proportion of the prizes. And here it may be noted as peculiar that a considerable bulk of the output of Fancy Cloths at Huddersfield, Dewsbury, Batley, Morley, &c., passes through the hands of the Leeds firms, and the Tweed Cloths woven by power in these districts constitute an important factor in the trade of the city.

Clothing Trade.—Only second in importance to the manufacture of cloth and other textiles is, at the present day, the ready-made clothing trade of the city, in which upwards of a hundred firms are now engaged, and which gives employment to many thousand hands, male and female. Everything that is most modern in labour-saving machinery is in use, and many of the manufacturers have their own retail clothing shops in the principal towns of the Kingdom. The products of the Leeds workshops find ready markets in every quarter of the Globe.

Engineering and Allied Trades.—Leeds is, at the present day, the centre of a large industry in these important

From a Photo by THE PORCH OF ADEL CHURCH. *Jos. Wormald, Leeds*

From a Photo by *Jos. Wormald Leeds.*

THE YORKSHIRE PENNY BANK.

of which its productions are regularly sent. The works are distributed throughout the working quarters of the City. The Tanneries are in every respect up-to-date in their appointments and methods of working. The Boot and Shoe factories share the prosperity of the other branches of this important industry, and while many of the makers cater for the Home markets alone and supply almost exclusively the heavier class of goods used by the toiling millions of Yorkshire, Lancashire and the principal mining centres, other firms have made a special study of the requirements of foreign markets, and their travellers have visited the leading commercial centres of the globe, until the fame of Leeds-made boots and shoes have spread literally from Pekin to Peru.

Printing and its many auxiliary trades, holds a prominent place in any Review of Leeds Manufactures, and the leading firms engaged in this important and ever developing craft, are second to none in the kingdom, whether for cheapness or production in the every day requirements of the business world, or in the variety and elegance of the artistic trades, including the manufacture of Steel Yorkshire Iron, Locomotives and Traction Engines, Textile and Agricultural Machinery, Boilers, Gas-holders, Axles and Springs, Machine Tools, Steam and Hydraulic Cranes, &c., &c. The largest works are situated in the Hunslet district, and in the vicinity of the Kirkstall Road; some of them employing over a thousand hands. Leeds-made Machinery, Boilers, Tools, and various kinds of Engines are in request in many parts of the Globe, and at the time of writing, some of these firms have Government and other contracts on hand that they will require upwards of two years to complete. The abundant and excellent coal supply in the immediate district facilitating cheap production is a great factor in promoting this prosperous state of things.

Leather Trades.—Next in importance to the trades mentioned comes, perhaps, the Leather Trade and its auxiliaries, the Boot and Shoe Trades. In plain and fancy leathers, Leeds is at the present time, one of the most important centres in the Universe, to all parts

From a Photo by *Jos. Wormald, Leeds.*

THE YORKSHIRE BANKING COMPANY.

and fancy work, for which every year shews a greater demand and in which are required as great artistic and ever changing novelties, as in any of the trades producing goods that are popularly understood to be comprised in the expression "The Fashion."

Pottery.—The Pottery trade of Leeds dates back to the second half of the 18th century, and for a time it was prosperous and was exported in large quantities to the Continent. From various causes the trade drifted into other quarters, but the discovery and developement of rich beds of fine clay existing in such quantities in the district led to the opening of the celebrated "Burmantofts" Works, whose wares are at the present day world-famous; they include common

From a Photo by JUNCTION OF BOAR LANE AND BRIGGATE. *Rosemont, Leeds.*

earthenware, glazed bricks, sanitary tubes, and the finer productions in Terra Cotta and Faience. The almost general use of the most artistic ware in connection with architectural decoration, has supplied "Burmantofts" with a speciality in which they are *facile princeps*, so far as British productions are concerned. Other less important manufactures carried on in this thriving locality embrace Flax Spinning, Glass Making, Paving and Flag Stones, Fire Bricks, and the hundred and one articles, both light and bulky, for which the clay of the district is so suitable, such as Drain Pipes, Sewer Pipes, Baths, Sanitary Ware, &c.

The Tobacco and Preserved Provision Trades of the district are taking rapid development, and in other branches of manufacture large numbers of busy workers find constant and remunerative employment, and contribute their quota to the general prosperity of the City—a prosperity the more durable from the fact that it is made up of so many and varying industries, and less liable to the long periods of stagnation through bad trade that occasionally visit the most thriving communities not as favourably circumstanced.

JOHN BARRAN & SONS,

Wholesale Clothing Manufacturers,

London Warehouse:
27 CANNON ST., E.C.

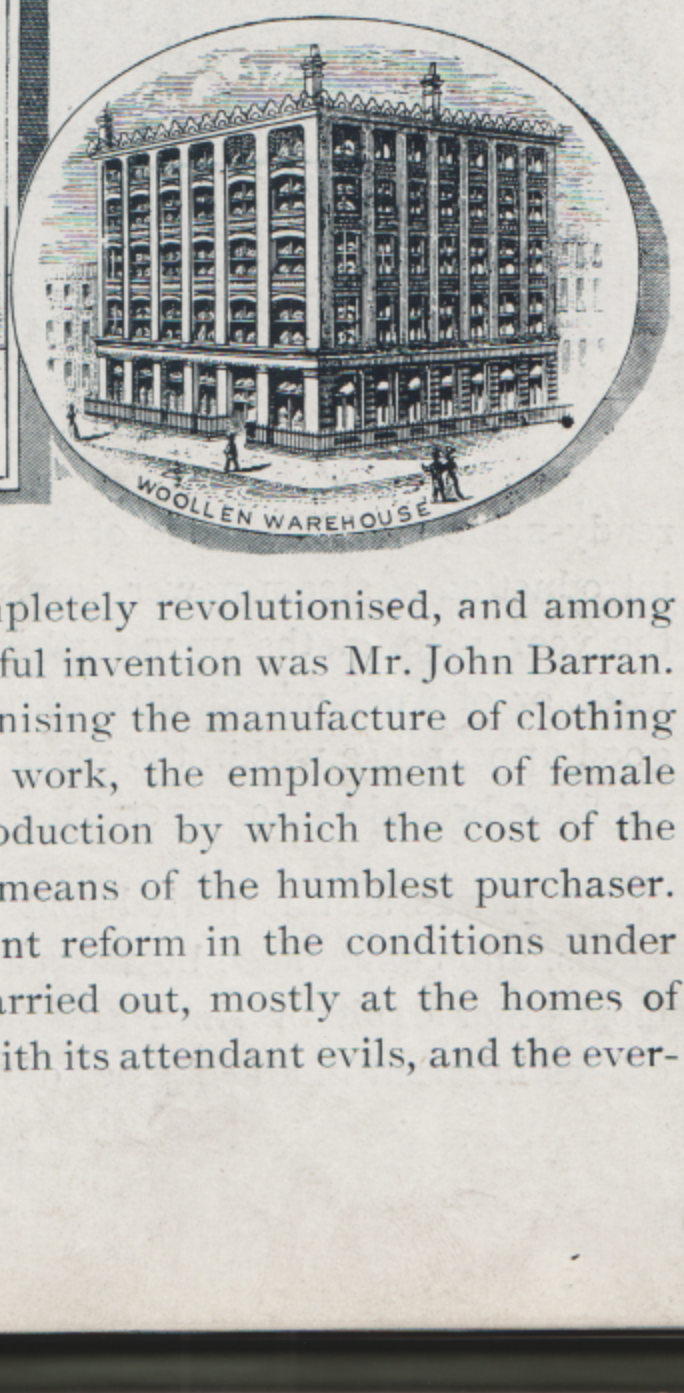
St. Paul's Street, LEEDS.

THE history of the industrial developments of the memorable Century now at its close, will record for few more remarkable events than the evolution and progressive growth of the great clothing manufacture inaugurated by the present Sir John Barran, Bart., and brought to a successful issue by that gentleman and his sons, who have been associated with the undertaking. It would be perhaps impossible to state how largely this industry has contributed to the splendid prosperity which Leeds enjoys, but it will be readily conceded that in the amount of capital invested, and in the number of hands employed, the clothing trade must be accepted as a prominent factor in its contribution to the general welfare of this centre of the textile manufactures.


WAREHOUSE


FACTORY

The inception of the factory system in the clothing industry dates back to the introduction of the sewing machine in the fifties, an event fraught with the most far-reaching effects on many branches of the trade


WOOLLEN WAREHOUSE

which this labour-saving contrivance may be said to have completely revolutionised, and among the first to foresee the immense future possibilities of this wonderful invention was Mr. John Barran. To this gentleman must be accredited pioneer honours in organising the manufacture of clothing on a large scale on a system of judicious sub-division of the work, the employment of female labour, and the use of machinery and all aids to economical production by which the cost of the garment has been reduced to a level well within the limited means of the humblest purchaser. With these advantages was also initiated yet another important reform in the conditions under which the work was performed. This had previously been carried out, mostly at the homes of the employees, on what was termed the "out worker" system, with its attendant evils, and the ever-

present risk of contagion from insanitary dwellings. Thanks to the efforts of Mr. John Barran, a quiet, but none the less salutary revolution was effected in this direction, all the manufacturing departments of the business being concentrated in the large and admirably constructed factory, with its spacious, well-lighted workrooms, and perfectly sanitary and healthful conditions all tending to the well-being and contentment of the workers, with the consequent results of securing greater uniformity of excellence in workmanship and increased wages for those employed.

In this connection, and as both pertinent and appropriate to this portion of our subject, we may be permitted to quote the following extract from an article from the pen of Mr. Henry Barran, which appeared in a handbook published in the year 1890, commemorative of the visit to Leeds of the members of the British Association. The writer, referring to the subject of the

THE FACTORY.

ready-made clothing trade of the district, states: "The first stimulus to the trade was due to the introduction of steam power, improved machinery, and the importation of Colonial wool. About the year 1840, cloths were further cheapened by the introduction of mixed yarns of cotton and wool, or of wool mixed with fibre obtained from working up old materials, bringing clothing of good appearance within the reach of the poorest classes. Above all, the invention of the sewing machine brought into general use about 1855, helped to reduce the cost of all kinds of clothing."

It was at this period that Mr. John Barran acquired suitable premises in Alfred Street, Leeds, and commenced business as a wholesale manufacturer of ready-mades. In common with most other explorers in a new field of enterprise, Mr. Barran had to contend with many difficulties inherent in all schemes of reform—either social or industrial—but by his indomitable energy

and perseverance these were finally subdued, and the business rapidly forged ahead as the first prejudices against ready-made garments were gradually, but effectually removed. Not only had the prejudices of the public to be smoothed away, but the powerful resentment of the trade in general had also to be encountered and surmounted, while added to the difficulties to be met was a deficiency at that time of the lighter form of textiles in woollens, tweeds and serges of inexpensive make, indispensible in placing a cheaper class of ready-mades on the market. To a man of Mr. Barran's energetic temperament such obstacles as we have indicated were created to be conquered, and wearing down by dogged persistence in the policy he had originated at the outset, the opposing forces to success, he had, in a few years, developed a business far beyond the capacity of the premises then occupied.

CUTTING ROOM.

In 1867 a new departure was taken by the erection of large premises in Park Row, and here the firm remained for ten years when again the exigences of increasing trade rendered it essential that still more commodious accommodation should be provided for its expansion. The site selected was in St. Paul's Street, and on the extensive area, measuring 15,000 square feet, the magnificent block of buildings was reared in 1878, from the designs of the well-known architect Mr. W. T. Amber. This palatial structure, five stories in elevation, is in the Moresque style of architecture with an exterior design in red brick and terra cotta, and alike in its handsome and imposing proportions, its adaptation to the purpose, and brilliancy of lighting may justly be pronounced unique among the temples of commerce, with which Leeds is so richly endowed. Serving at first as a factory and warehouse combined, the continuous increase of the business from year to year made that arrangement no longer possible, and in 1888 large premises were erected

in Hanover Lane to which the operative branches, with the exception of the cutting department, were tranferred. With the additional accommodation thus provided the firm were enabled for a time to cope with the requirements of the business but again its rapid expansion compelled to still further extend the premises, and with this object another large warehouse in Somers Street was built in 1891. This is reserved for Woollens and is connected with the St. Paul's Street establishment by a subway. Finally, if it be not presumptive to suggest anything like finality in an enterprise of this expansive order, the factory was greatly enlarged in 1897, thus giving a total floor-space of the enormous dimensions of four acres.

The St. Paul Street warehouse is now used chiefly for stock keeping and show room purposes but a part is occupied as the general and private offices, and the basement and top floor for the cutting department. In our inspection of the show rooms and their attractive exhibit of the firms manufactures which we may particularise as an interesting object lesson in the perfection now obtained in the output of ready-made garments, whether of stylish men's suits, overcoats, youth's school suits or of juvenile clothing, the latter having been the first speciality upon which the firm's great reputation was established. In the infinite variety and excellent taste of design of this sartorial display are illustrated the latest and most fashionable styles in tweeds lounge suits, morning coats and vests, covert coats and a wide range of new patterns in overcoats made in the new waterproof cloths which have now almost entirely superseded the old fashioned inefficient and objectionable odorous mackintosh.

To the visitor privileged to witness the operations in the cutting department of Messrs. Barran's establishment there is no more interesting feature of the admirable equipment than the method by which this work is accomplished by a system invented by the senior partner many years ago, and now universally adopted in the large manufacturing concerns in this and kindred trades. The story of the discovery may be briefly told. On one occasion, while watching the action of a veneer cutting machine, it occurred to Mr Barran that the principle was capable of application in the manipulation of layers of cloth, and after numerous experiments the present system, as simple as it is effective, was perfected. A pile of cloth of from 50 to 100 thicknesses is first marked out in the various patterns with chalk by the "Cutter," and is then placed on the cutting table and brought into contact with the cutting edge of an endless steel band or ribbon of razor-like keenness, moving at a high rate of speed which, following the chalked lines as the pile is skilfully manipulated by the workman in charge of the machine performs the work with speed and efficiency unattainable by human agency. The various segments of cloth, linings, &c., all cut on this system forming the components of a garment are then put up in bundles with a label of directions and forwarded to the factory to be machined and finished. Following them to their destination we may note *en passant* that this establishment is an immense building of five storeys, arranged in a series of spacious and lofty rooms, several of which have a floor space of 10,000 square feet each, amply lighted and thoroughly ventilated in accordance with the most up-to-date scientific methods. Innumerable sewing machines actuated by steam power are arranged in systematic order in rows extending from end to end of the departments, each with its female attendant, who, by a movement of the foot can control the speed by means of an ingenious attachment, an illustration of the late Mr. John Barran, Jr's. ability as an originator of inventions designed to facilitate the work or avoid the risk of accident to the worker. Further evidence of this solicitude on the part of the firm is furnished in the operation of pressing the garments which is performed by a mechanical "pressing machine," also a labour-saving device of Mr. John Barran's. The iron used is of the ordinary pattern, heated by gas, and its pressure is controlled by the worker's foot, who can thus exercise the needed pressure without severe exertion. Some 1,500 hands are constantly employed in the factory, working on a systemised sub-division of labour, and the most perfect and

efficient organisation for facilitating the output, the volume of which per day amounts to a truly astonishing amount. Notwithstanding the extent and completeness of their resources, Messrs. Barran & Sons, still experience the greatest difficulty in keeping pace with the demand for their goods, which is continually growing in the home and export markets of the world. The following details of the general equipment of the factory are also of interest. The machinery is driven by three engines of the Corless type, two of which are fitted with patent supplementary governors as they are connected with two Compton dynamos providing the current for 1800 electric lights distributed throughout the factory. The precautions against fire are also on a very complete scale, Grinnell's patent sprinklers being installed in connection with enormous gravity or air pressure tanks, and six inch connections from the town supply.

In their relations with their workpeople, Messrs. Barran have ever evinced their care and interest in their welfare and comfort, and an inspection of the cheerful dining room and well equipped kitchens on the ground floor indicate the close attention paid by the firm in this respect. Employing, indeed, a superior class of hands, carefully selected, the firm invariably pay the highest rate of wages, and as there are seldom any slack times, the lot of Messrs. Barran's work-people, in factory and warehouse, is one to be envied by their less fortunate fellows in the industry.

The establishment has been visited by most of distinguished notabilities of the age, among whom have been numbered the late Shah of Persia and his suite, the Shazada of Afghanistan, Lord Rosebery, Earl Granville, Professor Playfair, Miss Beatrice Potter and Sir James Paget, who paid a high econonium to the admirable health conditions of the workpeople, together with representative visitors from Japan, China, Siam, India, Australia, Brazil, Chili, Buenos Ayres, Mauritius, the United States, Canada, South Africa, Algiers, and all parts of the European Continent.

In closing our shetch of one of Leeds largest and most interesting industries we may not omit reference to the intimate association with the commercial and political activities of the city of Sir John Barran, who for so many years has been prominently identified with the public life of the City. From 1870 to 1872 Sir John, then Mr. Barran occupied the office of Chief Magistrate of Leeds, was President of the Chamber of Commerce from 1874 to 1876, and in the last named year was elected Member of Parliament for the Borough, afterwards representing the Otley Division in 1886. In January 1895, Mr. Barran received the honour of a Baronetcy in recognition of his long service in the political world and his many public and private benefactions in the district where he is so widely and universally esteemed by all classes of his fellow citizens.

The Monk Bridge Iron & Steel Works,

: : WHITEHALL ROAD, : :

LEEDS.

IN compiling an end-of-the-century review of the vast progress of the great industrial metropolis of the North, the evolution and development of the iron and steel trade to its present magnitude and importance stands out as one of the most striking and remarkable features. As directly confirming this fact may be cited the example of the Monk Bridge Iron and Steel Works, of Whitehall Road, which now employs a number of hands equal to, if not exceeding, that engaged in the whole of the industry in the district at the commencement of Queen Victoria's reign.

The history of the concern dates back nearly half-a-century, the business having been acquired in 1854 by the late Mr. James Kitson (the father of Sir James Kitson, Bart., M.P.), who had previously founded the well-known locomotive works at Airedale Foundry.

In 1886 the Monk Bridge Iron Company was converted into a private limited company, of which the present directors are Sir James Kitson, Mr. Frederick Kitson, his nephew, and Mr. Albert Kitson, his son.

In presenting a survey of the various deparuments at Monk Bridge Works, for which facilities have been placed at our disposal by the courtesy of the directors, we include only the mere salient features of interest necessary to a general description, without trenching upon matters of purely technical detail, which would entail too heavy a tax on the limits of space at our disposal. The Company's premises are advantageously situated for transport facilities, the Great Northern, Lancashire and Yorkshire, Midland, North Eastern, and London and North Western Companies all running alongside the boundaries of the Works, and are connected by sidings affording direct railway communication with all parts of the kingdom. The works, divided by the Whitehall Road, extend over large areas on either side, between the canal and Holbeck Station on the Midland Railway, the northern portion being occupied principally for the manufacture of iron and that on the south by the steel works. The handsome building containing the well-appointed offices is erected on the north side, and is of two storeys, flanked on the right by a covered gateway leading to the iron works. Passing through this entrance we are faced by a large shed in which is installed a fine plant of modern machinery, a department presenting a scene of busy activity, anticipating of the general aspect of every part of the huge concern.

Commencing at the initial stage of manufacture we may first refer to the raw material used. This is the best Yorkshire pig, and is procured from the pits of the York Road Coal and Iron Company, equal in every respect to the product of the Low Moor mines, the ore being extracted from the same bed, and smelted with the kind of coke at the blast furnaces in York Road. After undergoing the process of refining and puddling in the furnaces, the iron is hammered into slabs of three quarters to a hundredweight each, and is then broken under a steam hammer, and sampled in three qualities of which specimens are taken to the foreman or manager to be tested. When taken from the puddling furnaces, the slabs are conveyed to the large Siemen's gas furnaces, heated, and then welded by steam hammers into slabs of from 600 to 4000-lbs. In this building are erected five ponderous steam-hammers, four of six ton and one of eight ton weight. Passing into the plate mill, the slabs are again heated and put through the rolls, which turn out either bars or plates for locomotive or other boilers.

In the iron works departments the Company also make large quantities of merchant iron in bars, angles, &c., from $\frac{1}{4}$-in. to $5\frac{1}{4}$-in. diameter and the same sizes in squares, besides flat bars from $\frac{1}{2}$-in. up to various dimensions. In the merchant bar iron mills the rolls take bars up to 12 inches wide. The rolls are driven by four large engines, three of them working up to 1000 horse-power indicated, and one up to 60 horse-power. As conveying an idea of the enormous output capacity of the plant, it may be added that in addition to these there are employed in the various departments some thirty other engines, varying from 4 to 30 horse-power, the requisite steam being generated in thirty large boilers, representing nearly 1500 horse-power nominal. There are fourteen steam hammers varying from 6-cwt. to 15-tons, and in 1890 an important addition was made to the plant in the powerful hydraulic press working at the enormous pressure of 1200 tons, and capable of pressing ingots of 10 ton weight. This press was manufactured by Messrs. Tannett, Walker & Co., of Leeds, for making large forgings, experience having conclusively proved that the quality of steel is improved by working it under a press, and better results obtained than when it has been forged by the hammer process. Hydraulic power is also largely utilised for working the cranes in the various mills, and this is derived from the powerful pumping engines, one in the iron works and another in the steel works.

Throughout the entire works an observable feature of the arrangements is the stringency of the tests applied to the material after each process, one apparatus to which our attention was directed, being designed to ascertain the durability of the iron. This is effected by the falling of a weight of half a ton or a ton from varying heights on the tyres and axles submitted to the ordeal, those of the best Yorkshire iron being expected to double up under the test without fracture, after which they are taken to the testing house and subjected to a tensile test. Similar exactitude is exercised in testing the steel which is thus affected, a small piece of each quality is turned up on the lathe to a certain diameter and subjected to the action of a testing machine at a given pressure, by which means its comparative length or its reduction in diameter may be gauged as desired. In one portion of the premises is a fully equipped machine shop where the rolls used in the mills are turned up, and all tools and appliances required in the works are made and repaired. Over this are the joiner's and pattern maker's shops, and a short distance further are the smith's shops having at the end a $3\frac{1}{2}$ ton steam hammer and two of Siemens gas furnaces in which wagon and carriage axles are heated and forged. The pig-iron and ore from which the steel is made by the Siemens-Martin's

are analysed in the laboratroy to ascertain the proportion of sulphur, phosporous, and other impurities which must not exceed 35 thousandth of one per cent. in any case.

The furnaces are charged with 15 to 20 tons of metal at a time, and the melting and working down of the mixture to the desired temper takes on an average of 12 hours to complete. In this works the melting is effected by a combination of the Siemens and Martin's processes, by which a much better quality of steel is produced in less time. Until the adoption of this system in 1882 the steel used here for tyres was made on the old Sheffield principal, cast into ingots from crucibles. The gas for heating the furnace is manufactured by what is known as the Wilson process, the six producers of this type erected close to the furnaces, differing materially from the Siemens producers, being less complicated, and consuming smaller and therefore cheaper coal, thus effecting considerable economy in working. When the steel is ready for tapping, small trial pieces are ladled out, cooled and broken to ascertain the temper, and when satisfactory are cast into ingots in the usual manner. The ingots and tyres are lifted by means of powerful travelling cranes which traverse the building and are capable of handling weights up to 20 tons. The steel tyres, which this firm were the first to turn out in the district are made without welding, the pressure being given to the rolls by the hydraulic power, thus shaping the pattern in the solid with advantageous results in ensuring reliability and freedom from fractures.

About 15 years ago the firm commenced the manufacture of cast steel wheel centres for locomotives. This branch of their business has been steadily increasing, and at the present time they are turning out large numbers of such wheels. By reason of their greater strength and rigidity, steel wheel centres have now almost entirely superseded the old wrought-iron "built up" centre in this country, and many firms who formerly made iron wheels, have been obliged to discontinue the manufacture on account of the increasing demand for the improved type. A special department is used for the government officials and inspectors of the large railways and other companies making extensive purchases of boiler plates, axles, &c., where all these productions are submitted to final tests before being passed out of the works. The leading features of the Company's output are best Yorkshire iron (for which they have a deservedly high ruputation), crank and straight axles, boiler plates, bars, angles, and tees, and in steel, tyres, crank and straight axles, and the wheel centres to which previous reference has been made.

The Yorkshire Penny Bank,

Head Office: INFIRMARY STREET,

. . LEEDS . .

ONE of the handsomest edifices in a city noted for the splendour of its commercial establishments, the building occupied as the head-quarters of the Yorkshire Penny Bank is monumental testimony to the traditional habits of thrift of the inhabitants of the Ridings, as it is to the success of an institution, which, for nearly half a century, has claimed the confidence and popular esteem of all classes of Yorkshiremen.

Occupying a central position near to the General Post Office, the external aspect of the Bank premises, as illustrated in the view reproduced in the introduction to this Review, is architecturally imposing and suggestive alike of the prosperity of the institution and the good taste of its designers. With respect to the first-named condition, the following condensed report of last year's business will doubtless prove as interesting to our readers, as it is instructive, as the admirable character of the management and the stable confidence of the public. The principal features of the Directors' statement of affairs were:—

"During the year the number of deposits was 2,664,055, and the amount deposited was £8,211,625. The number of withdrawals was 751,320, and the amount withdrawn was £7,606,277. The number of open accounts at the end of the year was 432,786, and the amount standing to the credit of depositors was £12,500,861. The interest paid to depositors, or added to their accounts, was £311,154."

Branches have been opened in all the principal towns and villages of Yorkshire, and its borders the most recent being daily banks at Burnley and West Hartlepool, the total number of the Bank's establishments up-to-date being 928.

The Board of Directors comprises the following noblemen and gentlemen all of whom are widely known in the County. President:—The Right Hon. the Earl of Harewood. Vice-Presidents:—Christopher Empson, Esq., E. W. Beckett, Esq., M.P., Sir Edward Ripley, Bart., Lord Masham, Sir Thomas Brooke, Bart., Victor C. W. Cavendish, Esq., M.P., the most Hon. the Marquis of Zetland, and the Right Hon. the Earl of Wharncliffe. Directors:—T. H. Morris, Esq., James Shaw Newstead, Esq., James E. Maude, Esq., Surr Wm. Duncan, Esq., W. F. Osborn, Esq., Wm. Sheepshanks, Esq., Leonard Cooper, Esq., J. Campbell Thomson, Esq., H. C. Embleton, Esq., Joseph Nicholson, Esq., B. Douglas, Esq., Colonel H. Fawcett Pudsey, J. Norton Dickons, Esq. and A. Edmund Butler, Esq. Mr. H. B. Sellers is the General Manager and Mr. T. F. Pollock the Assistant General Manager.

Messrs. CLAYTON, SON & Co., Ltd.,

GAS ENGINEERS,

. . HUNSLET, LEEDS. . .

IN their own special branch of engineering, Messrs. Clayton, Son & Co., Limited, may justly be credited with the execution of some of the largest and most important contracts for gas plant at home and abroad, and as closely associated for nearly forty years with the mechanical industries of Leeds, possess exceptional claims to rank with the foremost representative firms to whom our work is dedicated.

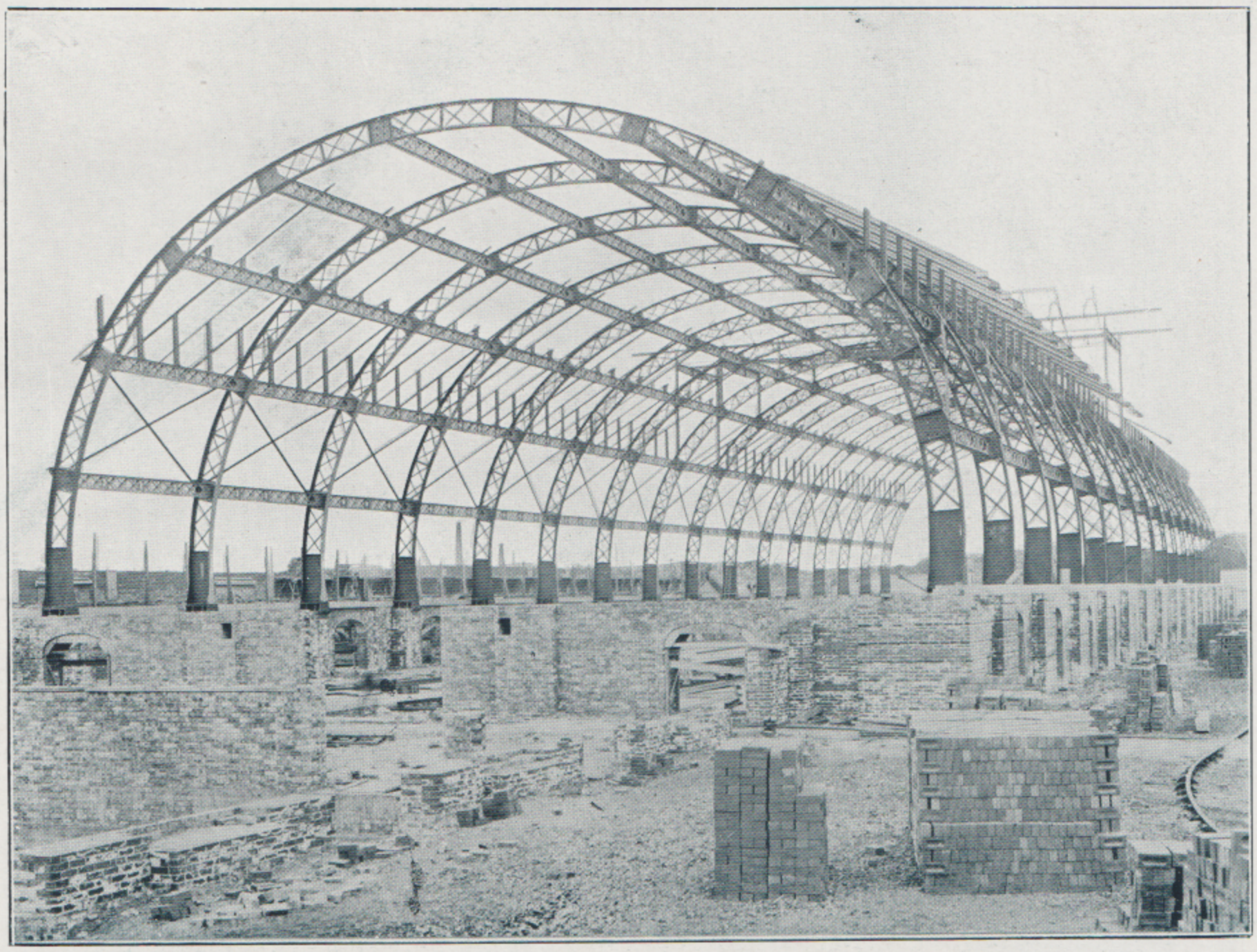
LANCASHIRE BOILER FITTED WITH DEIGHTON'S PATENT CORRUGATED FLUES.

The history of the undertaking furnishes an example of achieved success replete with interest to the student of industrial development in the century now at its close, and having, by the courteous permission of the directors, been placed in possession of the necessary data for the purpose, we have pleasure in presenting an outline of the rise and progress of the business.

This may be accurately stated to be contemporary with the life work of Mr. Lawrence Clayton, the present head of the firm, who commenced his career at Burnley at the early age of

twelve, but sparsely equipped with those educational weapons which are now deemed essential of success in after life. After four years spent in the boiler making works at that town, Mr. Clayton migrated with his father to Gorton, near Manchester, where he entered the employment of Mr. Walter Mabons, then a well-known gas-holder builder and ironfounder.

From this period Mr. Clayton began to direct his attention to the practical business to which he has since devoted his energies and abilities with such marked distinction, and with the experience thus gained was emboldened, in partnership with his father, to embark in business, and in 1862 acquired a small block of premises in Leeds for their venture. The first contract fulfilled by the young firm was the erection of a gas-holder for the Spilsby Gas Company in 1864. this order being followed by others of more or less importance, and although fighting an up-hill battle, Messrs. Clayton's business made steady and continuous progress, ultimately necessitating

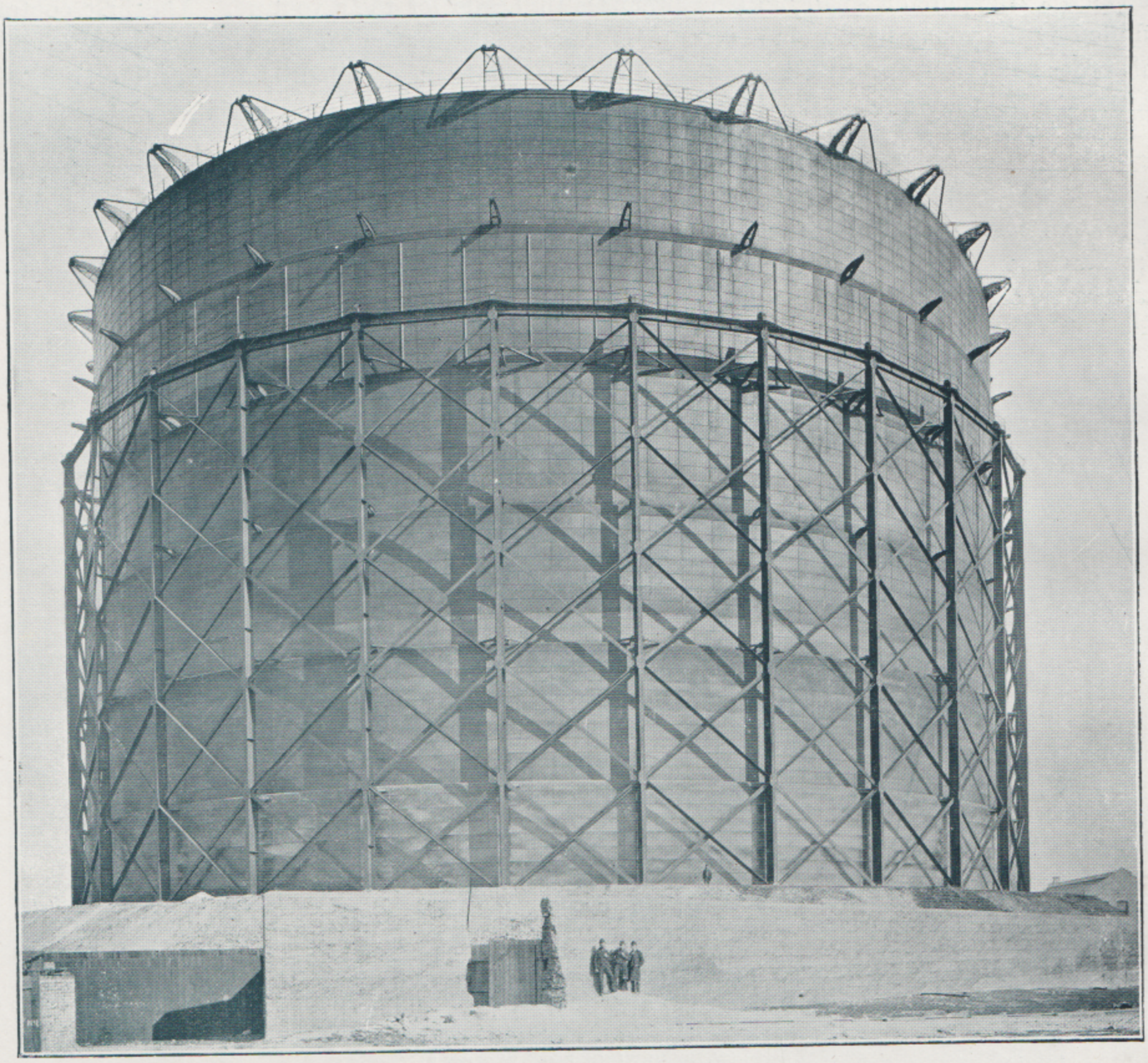


RETORT-HOUSE ROOF, 386 FEET BY 100 FEET, ERECTED FOR THE EDINBURGH AND LEITH GAS COMMISSIONERS. (W. R. HEWING, ESQ., ENGINEER).

the provision of much more extensive accommodation for the rapidly growing requirements of the business. This was effected in 1876, when the present site was secured at Hunslet covering an area of ten acres on which the new works were erected. These are conveniently situated on the Midland Railway with adjacent siding connection, and are completely equipped with plant comprising all the latest and most improved labour-saving appliances and tools for facilitating the execution of the largest contracts. The machinery is partly driven by electric motors, and powerful locomotive steam cranes are largely employed for handling the heaviest pieces of work, while hydraulic power is used for many of the operations.

Continuing the personal history of the firm it should be added that the senior partner died in 1883, leaving his share of the business to Mr. Lawrence Clayton and Mr. Joseph Hartley, and

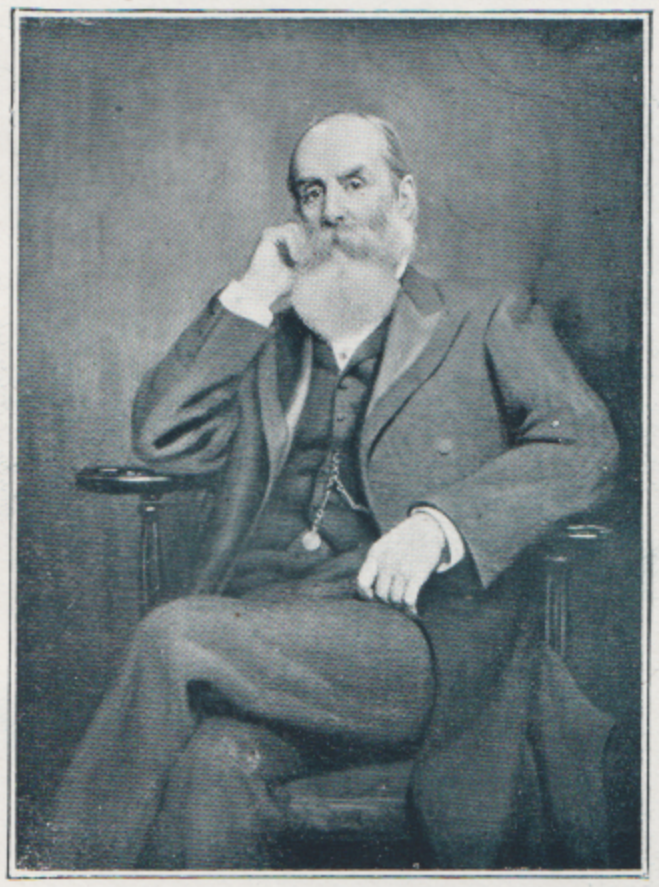
this partnership was continued down to 1886. At this time the business had further increased, and with the object of giving the principals a personal interest in its advancement, the concern was formed into a limited company with a capital of £40,000. This has since been increased to a sum of £120,000. The Board of Directors, as at present constituted, being Mr. Lawrence Clayton, Chairman, with Messrs. Joseph Hartley, J. R. Pickering, Joseph Clayton, and John J. Baines, acts as Secretary to the Company.



THE LARGEST GAS-HOLDER IN THE WORLD.

From Messrs. Clayton's works have been turned out many hundreds of gasholders for the principal gas companies and corporations at home and abroad, the firm enjoying the distinction of having erected the largest structure of the kind ever made. This enormous holder was constructed for the South Metropolitan Gas Company and measures 300 feet in diameter with six lifts on the telescopic principle rising to a height of 180 feet above the level of the tank, and having a holding capacity of 12,158,000 cubic feet of gas. Next to this in size was the gasholder erected in Leeds, which is 240 feet in diameter, rising to an elevation of 120 feet, the tank, constructed of steel, being the largest metal tank in the world. Amongst other important contracts carried out by Messrs. Clayton have been those for large gasholders at

Glasgow, Melbourne (Australia), Bolton, Blackpool, and more recently for Douglas, St. Anne's-on-Sea, Lytham, Maidstone Carnarvon, Shotley Bridge, Yeadon, Hull, Woodford and Edinburgh, the latter including a large retort house roof for the new gas works at Granton. At the present time the Company have in hand numerous large constructional contracts for gas works generally, and a number of high-class Lancashire boilers, some of which will be fitted with Deighton's Patent Corrugated Flues, of which company Mr. Lawrence Clayton is chairman. He is also on the Board of Messrs. Rice and Company, Limited, Hydraulic Engineers, Elland Road, Leeds.



MR. LAWRENCE CLAYTON.

About seven hundred hands are regularly employed by Messrs. Clayton, half of that number at the works and the other half in the erection of gasholders, &c., in various parts of the Kingdom and abroad, contracts having been completed in recent times at Stockholm, Strasburg, Santiago and Sabadell, in Spain.

The firm are on both the Admiralty and War Office lists, and have London Offices in Queen Victoria Street, E.C.

ARTHUR PARSONS,

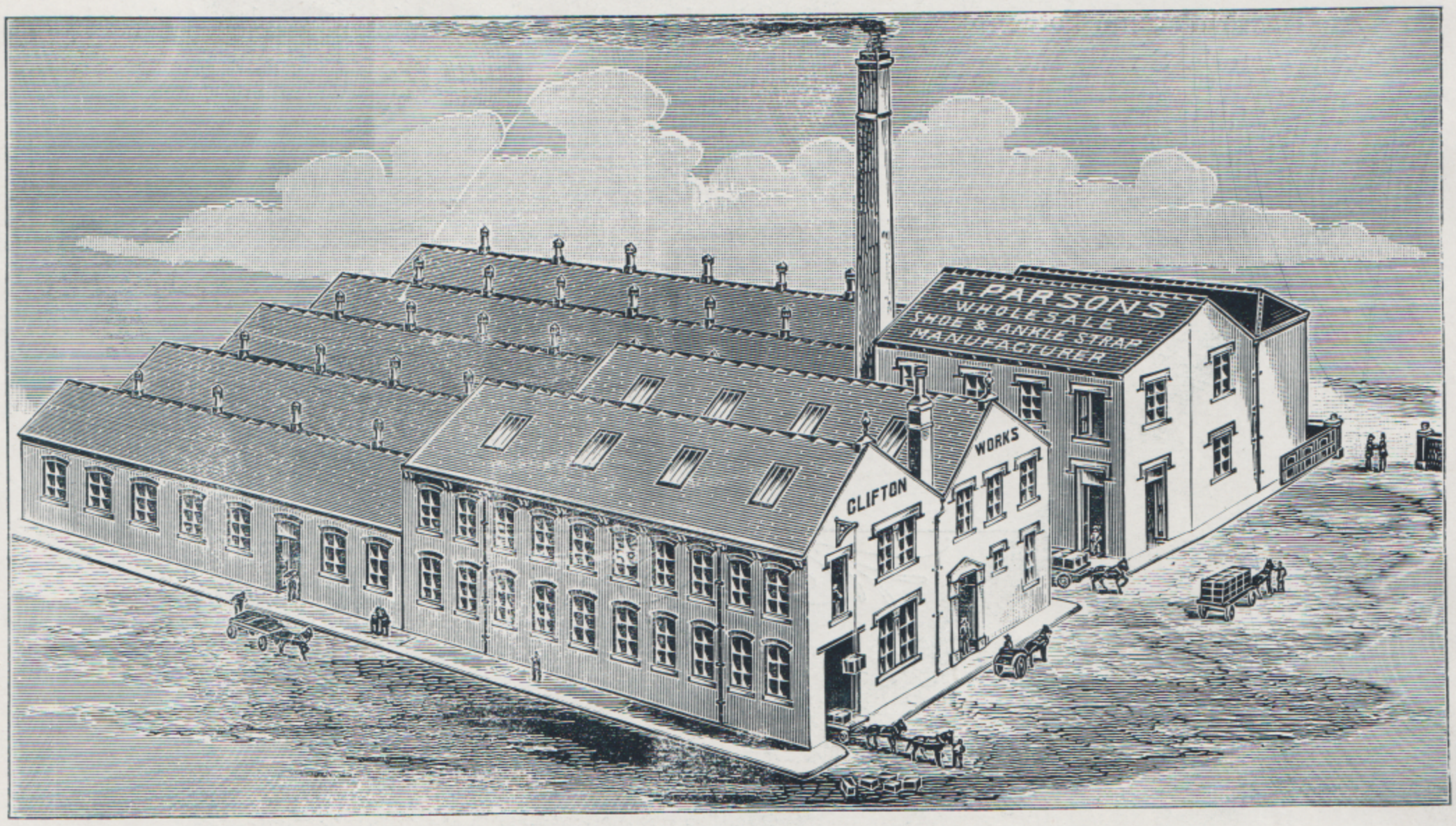
WHOLESALE & EXPORT BOOT & ANKLE-STRAP MANUFACTURER,

. . Clifton Works, LEEDS. . .

Telegraphic Address: "ANKLES, LEEDS."

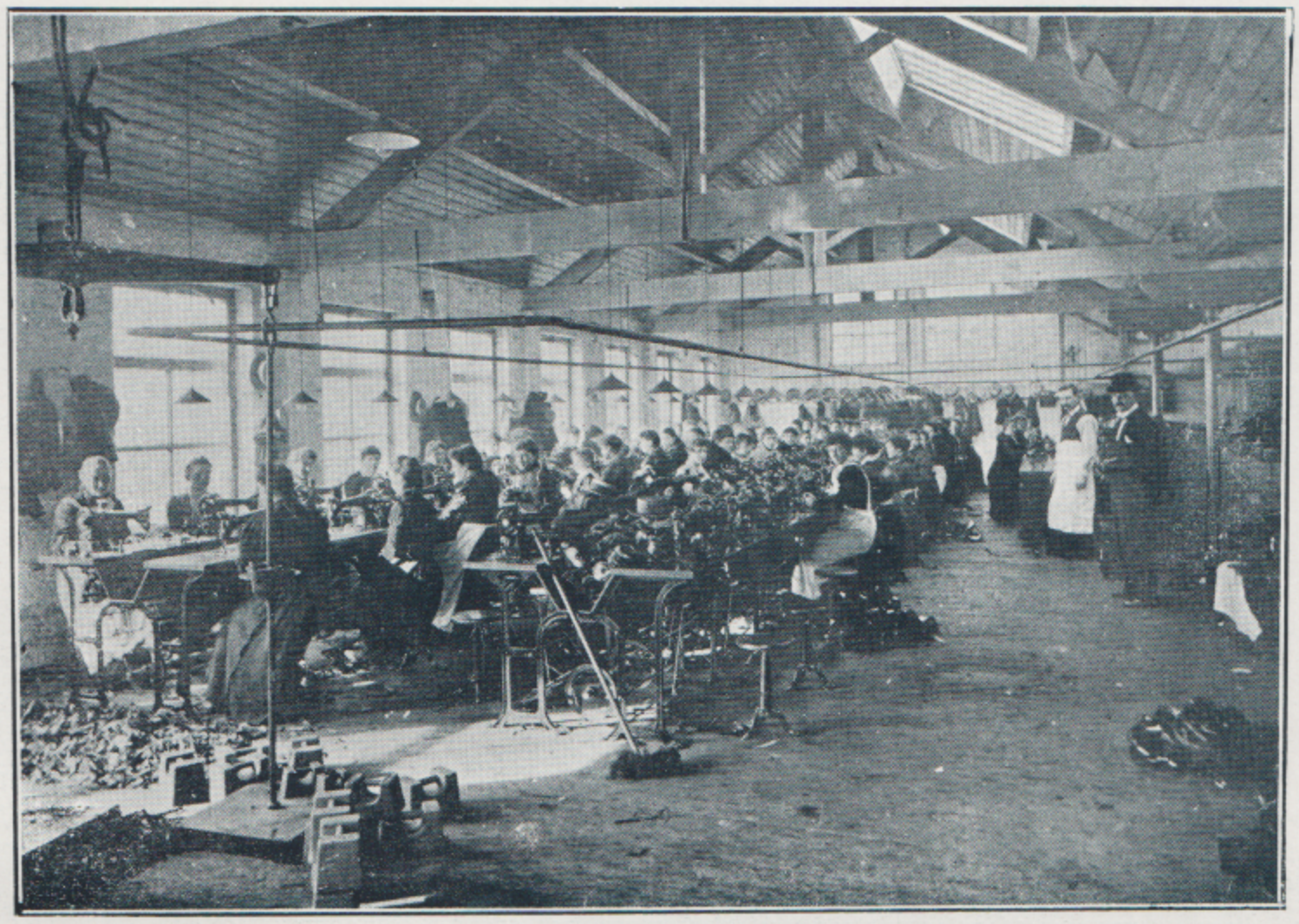
Telephone: NO. 2603.

FREQUENTLY as have been recorded in these reviews the rapid and successful development of some of the most prominent Leeds firms, there have been few instances of more speedy advancement than has been accomplished by Mr. A. Parsons, whose business career we have pleasure in outlining in our sketch.



Commencing business in the Meanwood Road in January, 1894, as a manufacturer of boots and ankle-strap shoes, Mr. Parsons started on most modest lines with a solitary workman as his assistant. In a very short time he removed to more extensive premises in Clifton Street, where he remained until the beginning of the present year. At that time the accommodation became altogether inadequate to the requirements of the steadily growing business, and having secured an eligible site the new factory was erected and the business again removed to "Clifton Works," as the establishment is styled.

The fine block of buildings covers an area of 73 yards by 65 yards, the ground floor workshop extending the full depth of the premises forming a commodious, lofty and well-



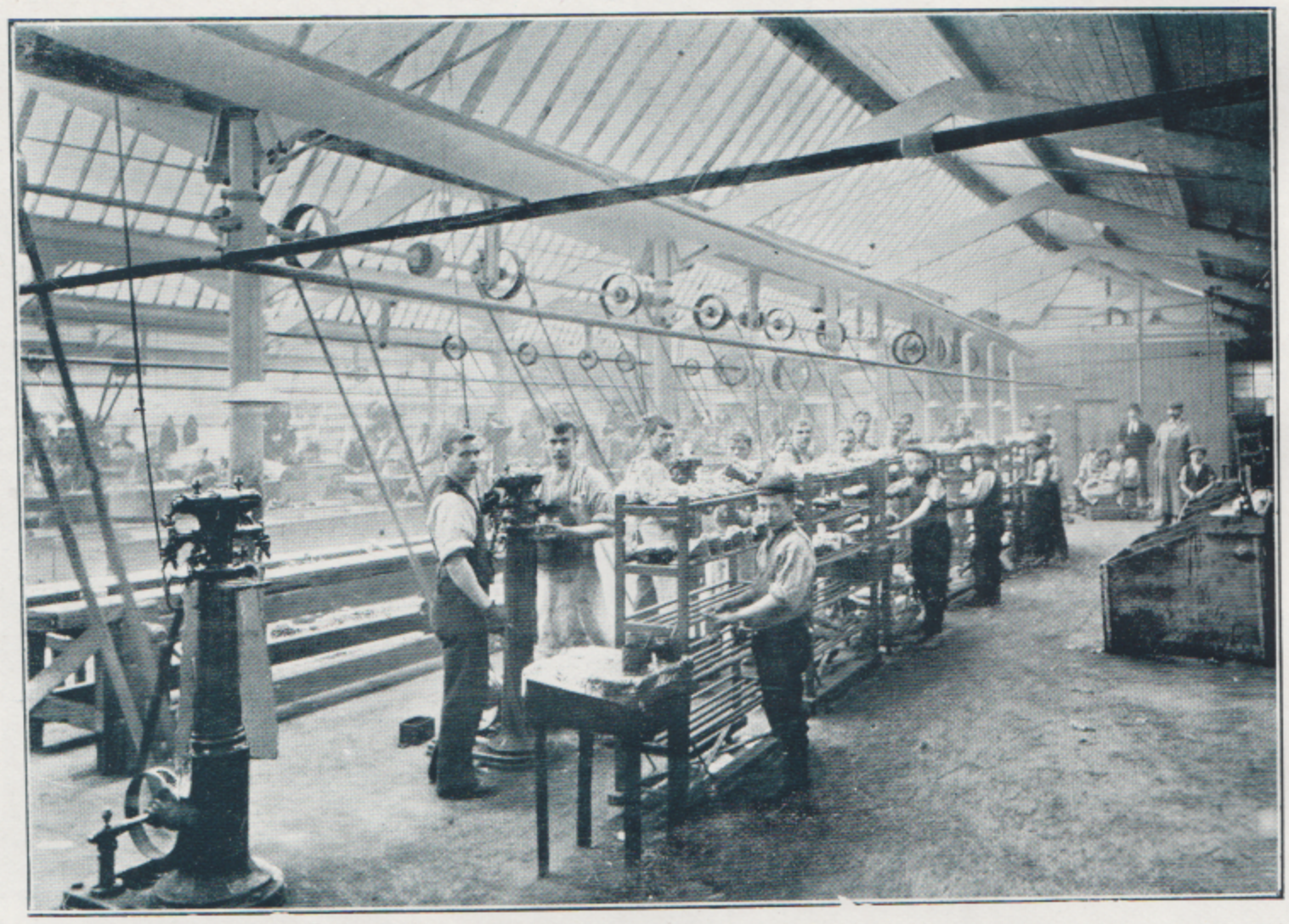
MACHINE ROOM.

lighted apartment divided off as the general and private offices, leather stores and engine house containing a fine gas engine of Crossley's build employed in driving the numerous machines

RIVETTING DEPARTMENT.

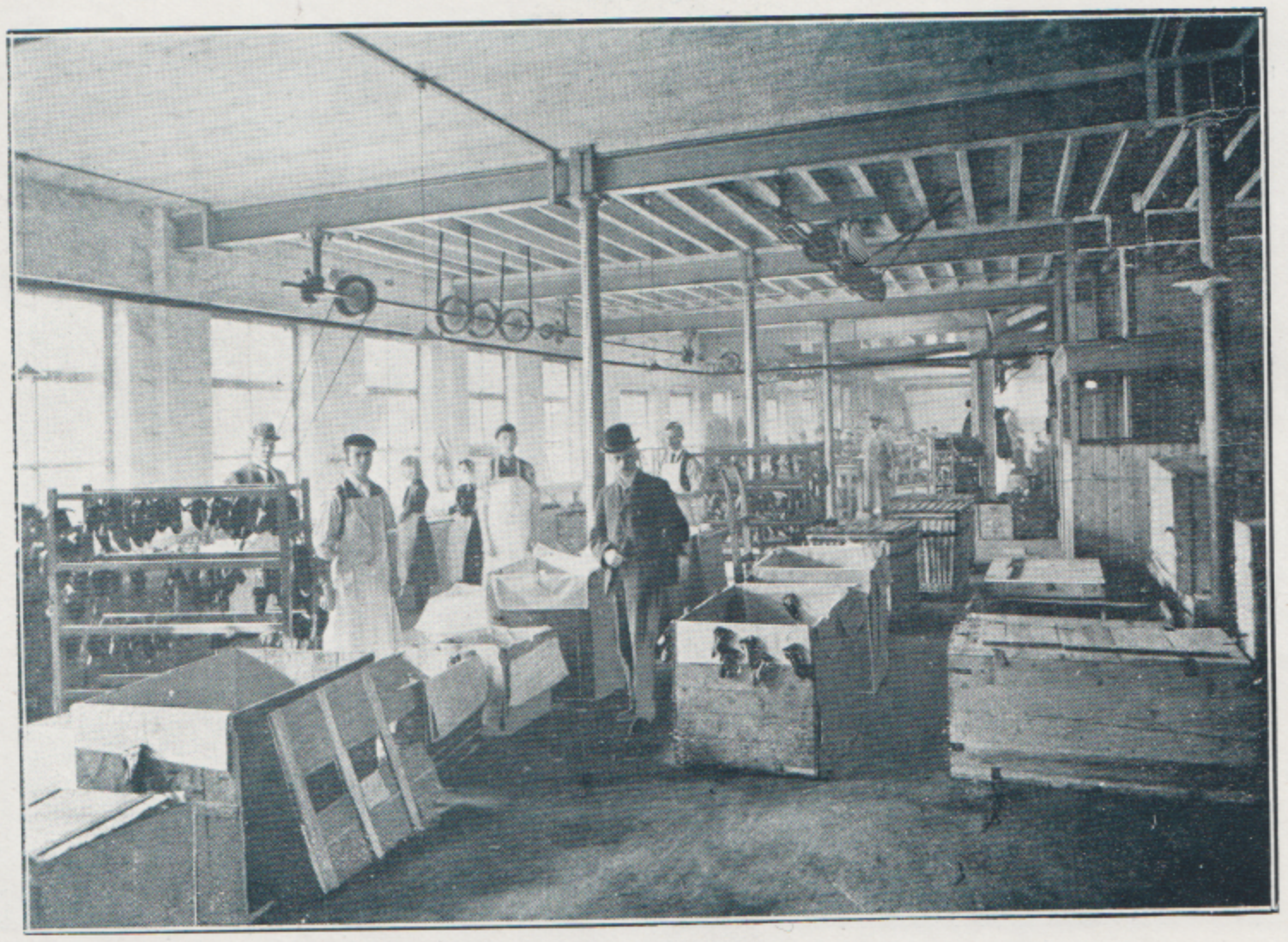
in use in the works department. There is also another of Crossley's engines of the Otto type of 12 horse power for driving the dynamos connected with the electric light installation

by which the works are lighted throughout. On the first floor in the front portion of the building is arranged as the machine shop, and making-up and finishing depart-



FINISHING DEPARTMENT.

ments, the first-named, a spacious room being furnished with a large number of sewing machines each in charge of a female hand, and at one end a number of male operatives



PACKING ROOM.

is engaged at the clicking benches. The organisation and equipment of the establishment throughout are designed on the most complete and efficient lines, the plant comprising

the best labour saving appliances for economising the cost of production of each class of goods manufactured. These are exclusively confined to what are technically described as "ankle strap" and bar shoes, which are produced in a great variety of tasteful patterns, and in quality of material and high standard of workmanship and finish are equal if they do not surpass any similar goods in the market.

As evidencing the progressive character and enterprise of Mr. Parson's energetic management, it may be stated that from the single individual engaged when the business was started, the number has risen to 300 male and female hands employed in the several branches, all of which are under the personal supervision of the gentleman whose indomitable perseverance and mercantile capacity have built up this phenomenally successful industry.

Messrs. E. SLATER & SONS, Ltd.,

MANUFACTURERS & MERCHANTS,

Providence Mills, Stanningley, near LEEDS.

Telegraphic Address: "COVERT, LEEDS." *Telephone: No. 1316.*

DATING back to the earliest period when cloth making became a staple industry of the district, the name of Slater has been identified with the trade through four generations of the family in succession, a record we believe almost unique in the annals of Yorkshire commerce. The exact date of foundation was 1760, when Mr. J. Slater, of Geadon, great grandfather of the present proprietors commenced the manufacture of woollen cloths for Army uniforms. At that time motive power for the mills was supplied by water wheel, and it is of interest to note that Mr. Slater was the first to adopt the steam engine for this purpose in the district.

In 1844 the present title was assumed, the business being continued on ordinary lines until 1895, when it was formed into a private limited company, the Directors now being Messrs. C. H., H., and P. Slater, Mr. E. Slater senior, having died in December, 1899. The firm's principal manufactures are all wool—no worsted being used in the mill—venetians, covert coatings and meltons of high-class quality, and as their name is still retained on the list of Army Contractors, it may be presumed that Messrs. Slater can justly claim a longer connection with Government supplies than has been enjoyed by the majority of their contemporaries in the trade.

The Providence Mills, the firm's own property, as is also the Upper Mill which is let off, are close to the Great Northern Railway system, and comprise a substantial and commodious building of four storeys furnished throughout with a complete modern equipment of plant and appliances by which the raw material is passed through all stages of preparation and manufacture to the final processes of dyeing and finishing. A numerous staff of hands is employed in the various branches of work, all of which are carried out under careful and competent supervision in order to ensure the uniform reliable quality of goods which has become a time honoured tradition of the house, Messrs. Slater & Sons' City warehouse is at 51, Park Place, a central thoroughfare of Leeds, and here are kept large stocks of cloths in various patterns to meet current requirements of the local wholesale buyers. The firm are represented by travellers in all parts of the United Kingdom, and do a considerable export trade to every quarter of the globe.

W. H. BAXTER, Ltd.,

The Leeds Stone-Breaking & Ore Crushing Machine Works,

Gelderd Road,

LEEDS.

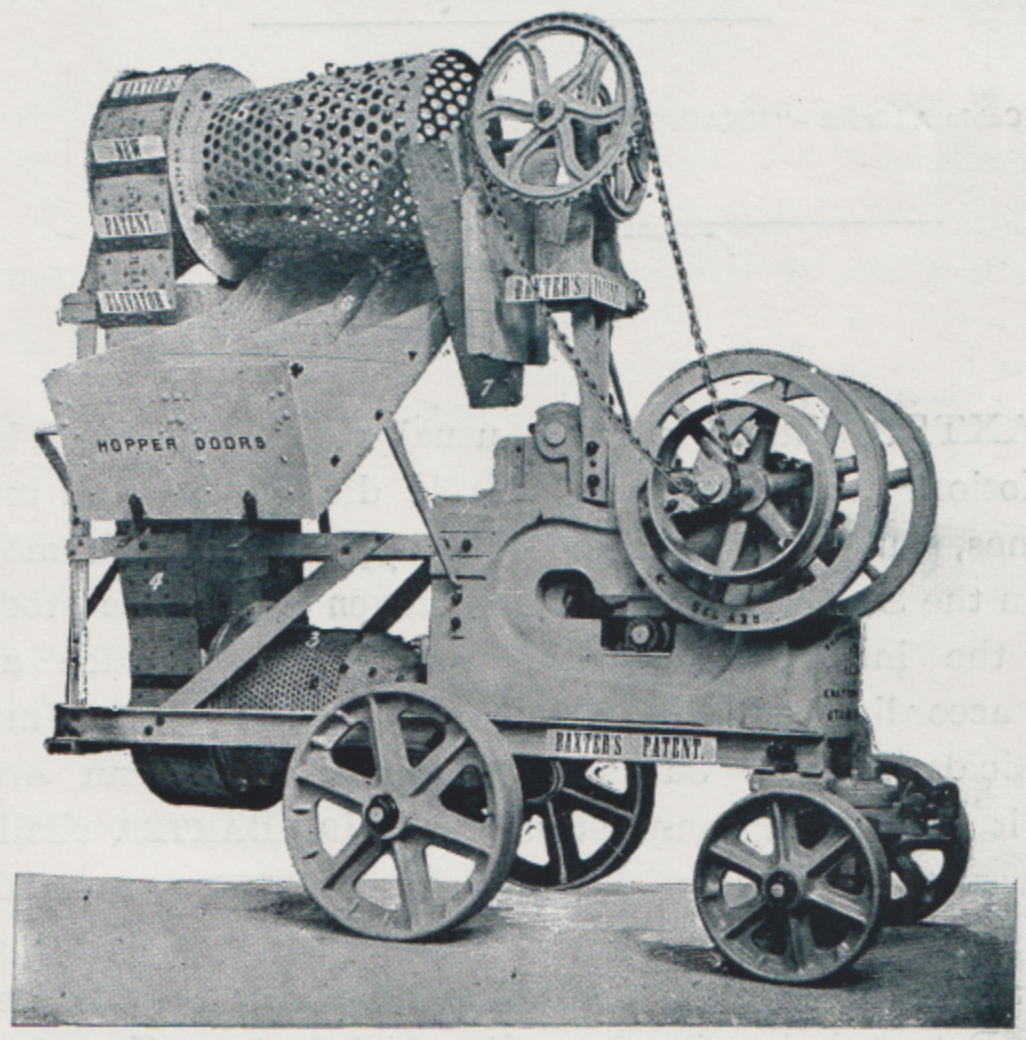
Telegraphic and Cable Address—"KNAPPING, LEEDS." Telephone, 663.

"MR. W. H. BAXTER (Stand 222) as usual exhibits one of his 16 × 9 Improved Knapping-Motion Stone Breakers. It is difficult to find much new to say about these machines, but MR. BAXTER is a typical Yorkshireman—we hesitate to say Englishman, because in the South, immigration is degenerating the stock. The characteristic of MR. BAXTER is the intense energy in striving to produce a machine that shall "lick creation," and according to the testimonials he gets, he seems to have about done it. A keen mechanical instinct, business ability of no mean order, have raised the firm about as far as it can go in competition, and MR. BAXTER challenges, more, he defies competition." Such was the opinion of MR. W. H. BAXTER expressed by a writer in "The Contract Journal" as far back as 1891. The advance made by the firm, of which MR. BAXTER is the moving spirit and master mind, since that date may best be determined in the latest achievement—Baxter's Patent Swing Crusher—by which he has effected a remarkable revolution in mechanical principles in this the latest development of one of the most successful and interesting of Leeds industries. Previous to entering upon a description of the most recent invention identified with the name of the firm, we may at this stage briefly recount the history of the rise and progress of the business. This was originally founded by MR. W. H. BAXTER, the governing director of the Company over twenty-two years ago on a very modest scale, he having even had to borrow money to complete his first patent, thus, as a matter of fact, commencing business in debt. By sheer single-handed perseverance, force of merit, and the characteristic Yorkshire "grit" and indomitable energy of its founder, the business rapidly forged ahead, MR. BAXTER being a firm believer in the dictum that obstacles are created only to be surmounted, and with perfect faith in himself and his works, as became a man of Hunslet, he has attained to an eminence in his special branch of the engineering industry which places his firm in undisputed supremacy in this field of enterprise.

The initial start was made in the construction of an improved type of rock breaking and ore-crushing machines, in which was combined his patent "Knapping Motion," which has since been adopted by most of the principle Corporations and Highway Boards in preference to any

other make in the market, twenty-five having been supplied to public bodies alone during the last twelve months. Since the first of these machines were introduced, MR. BAXTER has secured all the highest awards in working competition, and his make has superseded over 150 stone crushers by other firms, several of which were first selected in preference to Baxter's. With the continuously increasing demand for his specialities, MR. BAXTER found it requisite to provide more commodious accommodation for the works departments, and in 1896, erected a new foundry 96 feet in length, besides considerably extending the fitting and erecting shop by another 60 feet, and building additional stores for materials and finished parts.

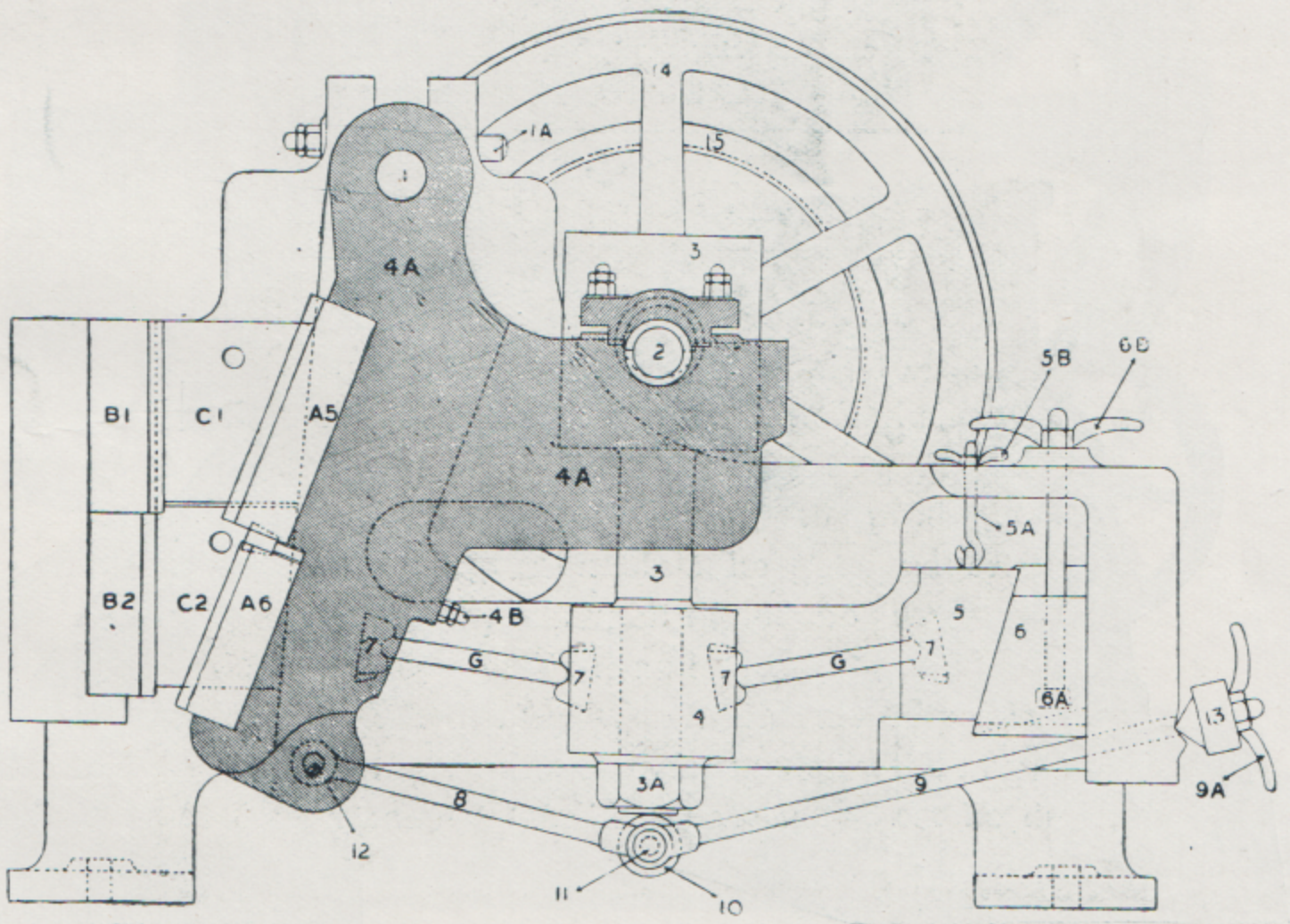
The premises occupy an extensive area of ground at the corner of Gelderd Road, near the new cattle market, the offices being in the first-named thoroughfare, next to these being the erecting shop, and beyond this the new foundry. Other buildings are occupied as fitting shop, weigh-house, stores for castings, &c., enclosed in a large yard furnished with a powerful crane for



Baxter's Patent Portable Stone-Breaker, Screening and Loading Machine.

loading and unloading. Travelling overhead cranes are also placed in the erecting shop, and foundry and machine shops, all of which are equipped throughout with the most efficient and improved plant for economising labour and minimising the cost of production in the several departments. At the time of our representative's visit, the extensive workshops were full of machines in various stages of completion, and notwithstanding the recent enlargement, it was evident that lack of space for the constantly growing business would necessitate still further extensions of the premises, a matter we understand which is now receiving the proprietors' consideration with a view to its accomplishment at no very distant date. Before entering upon a description of the latest development of the firms speciality, we may broadly outline the points of advantage embodied in Baxter's 1899 Patent Stone Breakers. These comprise: *Power*.—Proof of economy in power—only 4 cwts. of coal consumed for 70 tons of hard Whinstone broken; others use from 7 to 10 cwts. for a less quantity of stone broken. *Capacity*.—Approximate output 50 per cent. over that of any other maker's list. *Sample*.—The irregular movement of the jaw, combined with the firm's cubing jaws and automatic arrangements, produces a more uniform and

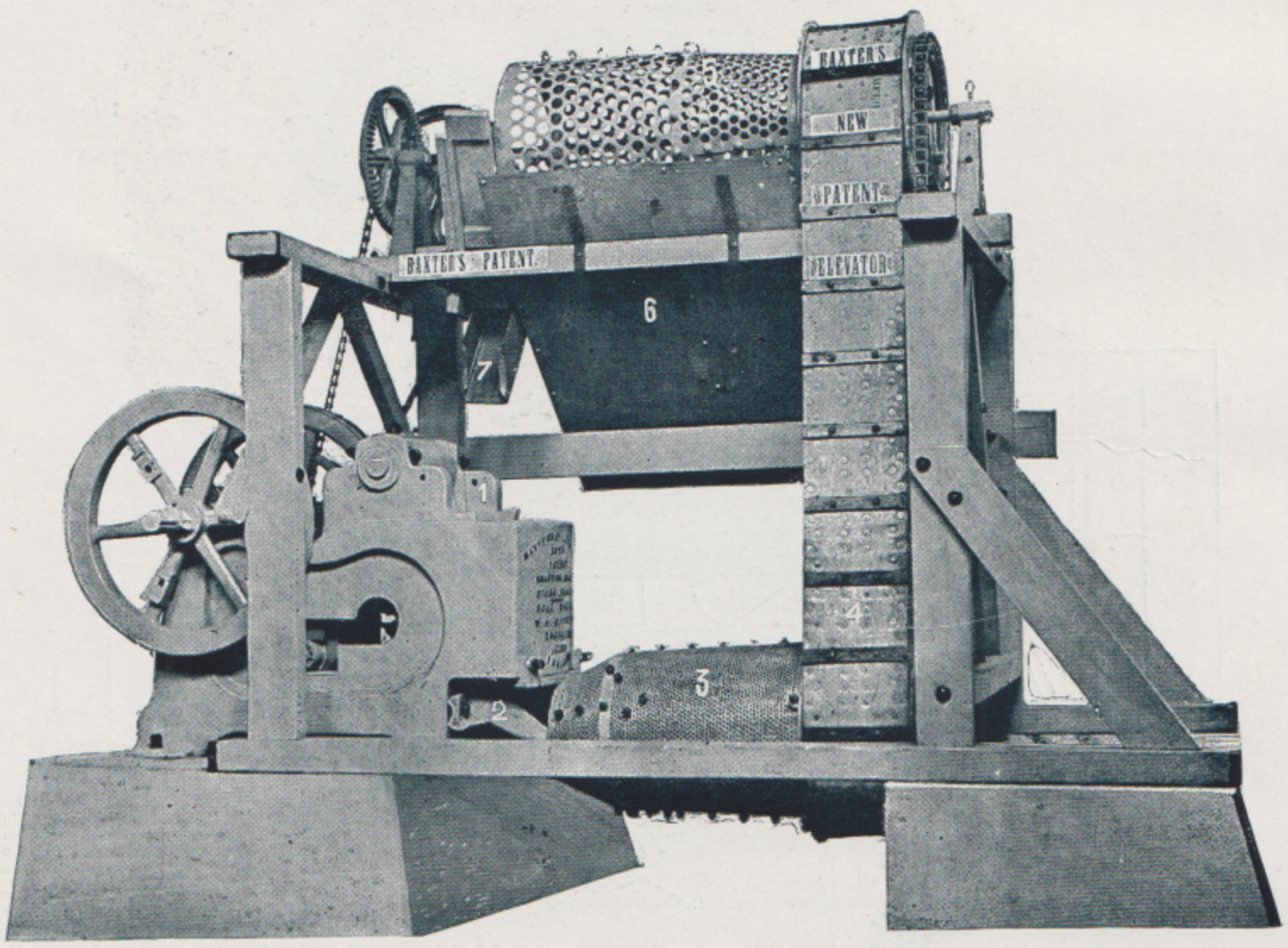
cubical sample of macadam ; or for crushing purpose are employed Improved Reversable Crushing Jaws, the irregular movement also preventing the material adhering to the jaws, thus increasing the output. *Regulation.*—The machine can be regulated to break any size, from road metal to fine gravel, without even stopping the machine or the aid of screw keys, thereby causing no loss of time by stopping, as in most others, some of which are very difficult to regulate, and impossible to adjust without stopping and replacing some part of the machine. *Durability.*—Greater durability of working parts, the shaft bearings lasting on an average three times longer than any other ; no oilbath or stream of water required to keep the shaft cool, further proofs of economy in power. *Steadiness in work.*—They are perfectly steady when working, even on wheels, and when fixed on high vertical pillars *do not* require very securely, if any, bolting down. *Renewals.*—With each machine the firm supply a printed Calico Instruction Sheet, which enables the workman in charge to make any regulation or renew any part in the best possible manners. All renewals are despatched the same day as the orders are received for them, thereby obviating troublesome and costly stoppages of work.



Sectional Elevation of Baxter's Patent Swing Crusher.

As we have previously suggested the crowning triumph of MR. BAXTER'S long practical experience and inventive genius is seen in his latest achievement, the Patent Swing Crusher, incorporating Baxter's New Patent Mechanical Motion as applied to a stone crusher, which is also applicable to many other machines, by which pressure given off, assists to give that pressure, and dead weight of fly-wheels and moving parts utilized, never before thought possible of accomplishment. The new principle may be thus described :—The whole of the mechanism is in suspension —as will be seen in the accompanying diagram—from shaft 1 and retained in working position by retaining rod at point 13: fig 2 is the eccentric shaft, upon which are the fly wheels, driving pulley and pitman, which are supported in bearings on 4a, all of which have a falling action towards the jaws from shaft 1, which further assists in crushing the stone. Thus all moving parts and pressure assist in crushing the rock, hence, greater pressure on the eccentric shaft greater the assistance to do the work, and greater is the ecomony in power. It will at once be seen that this is an entirely new principle, whereas formerly all this power has been wasted on the

bearings at each side of the frame in all machines, and so excessive has this been that it has broken hundreds of eccentric shafts, pitman's, and even, in some cases, the frame in two under the shafts bearing in the Blake type (still recommended as the best by would be makers of stone breakers), proving if necessary, the amount of power economised in Baxter's new principle of utilising all this great pressure to assist in doing the work, and thus greatly reducing the power required, and the wear of the bearings and eccentric shaft. The advantages thus obtained are admirably condensed in the following extracts from the "Implement and Machinery Review," for June 1900, which places these points in a nutshell: "Just as a trained prize-fighterputs the whole weight of his body into his blows and not merely that of his ams, so the Swing Crusher puts into its blows not a portion only, but as far as possible, the whole of the available mechanical power and deadweight of the complete machine." Highly satisfactory have been the results obtained from the several tests to which the Swing Stone Crusher has been subjected, tested by frictional pressure alone a 12 by 8 machine running at 220 revolutions per minute, on throwing off the belt

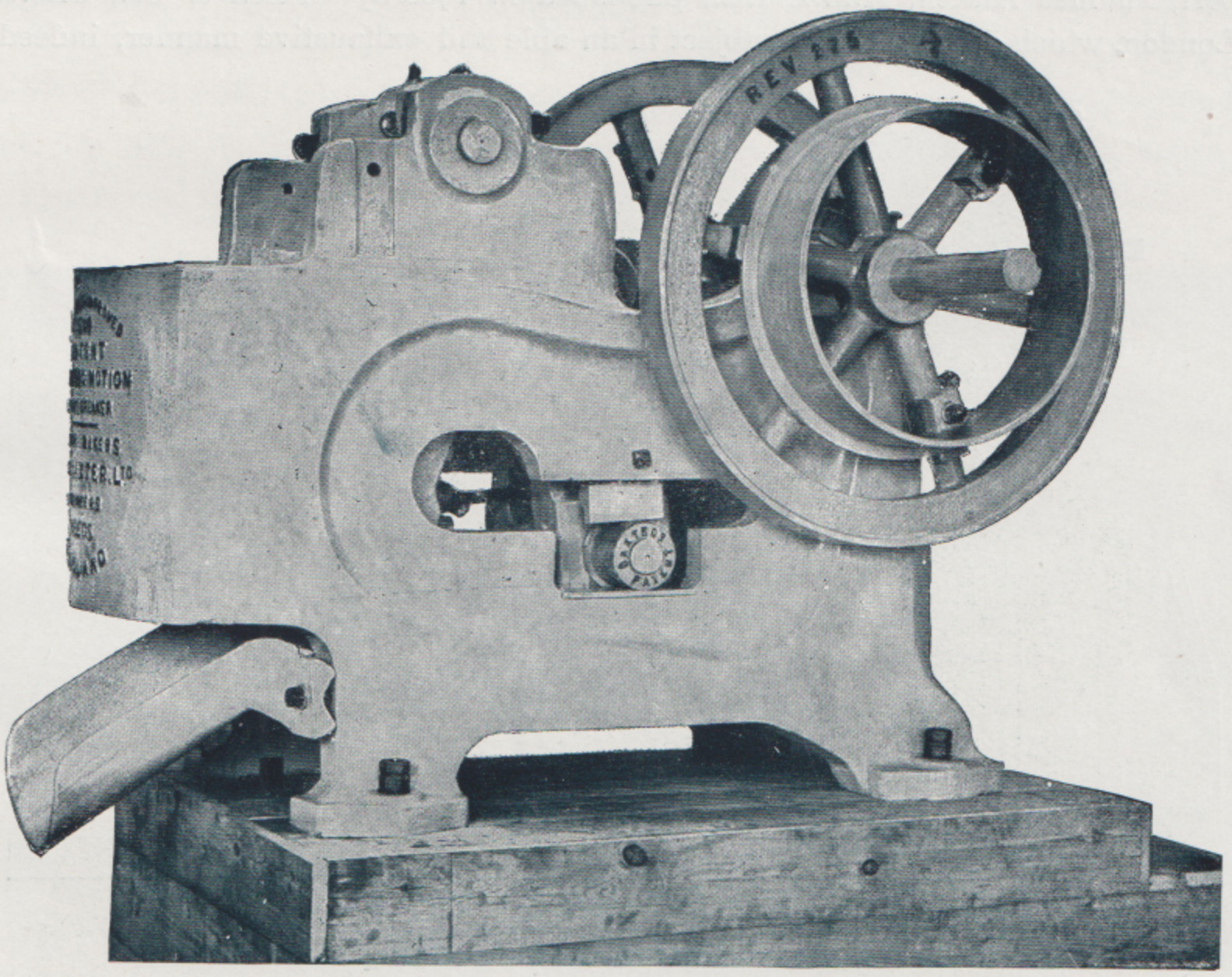


Baxter's Patent Fixed Stone-Breaker, Screening, Elevating and Delivery Arrangement.

ran for 4 min. 18 secs. making 483 revolutions; the 12 by 8 Improved Blake ran for 40 secs. making 73 revolutions only under equal conditions. Tested by weight pressure, the efficiency is increased from 30 °/₀ in the Improved Blake to over 55 °/₀ in Baxter's Swing Crusher. By this invention, friction has certainly been reduced to almost its minimum, the tests above stated having been witnessed by an expert from one of the leading trade journals, and confirmed in "Engineering." A further test is recorded at the Royal Show, York, June 1900, when one of Baxter's Patent Swing Crushers ran for 6 mins. after the belt was thrown off, making over 700 revolutions before it stopped, and furnishing additional evidence that the machine's principle gives the least frictional mechanical movements available in connection with stone crushing plant or other heavy machinery. That the machine has quietly created a very favourable impression is conveyed in the appended extract from a letter received from the purchaser of the first Swing Crusher, an unsolicited testimonial to its merits. "We beg to enclose you cheque in payment of your account for 12 by 8 Swing Crusher, which please discharge and return in course and oblige.

The machine is giving every satisfaction we are glad to say, and we shall be pleased to show it to any intending purchasers you may send for that purpose."

During our inspection of the erecting shop we had an opportunity of examining another very interesting and novel piece of machinery in the form of a new and improved sand, stone and coal washer of MR. BAXTER'S invention now building in the establishment, and not yet placed on the market. This machine is on an entirely new principle, the form of construction ensuring that the material treated *i.e.*, the finished product, passes through clear water in the process. The improvement indicated will be largely appreciated in the various trades for which it is adopted, and it may be readily anticipated will be cordially welcomed by those who have had the troublesome experiences inherent in effecting this process by the old methods.



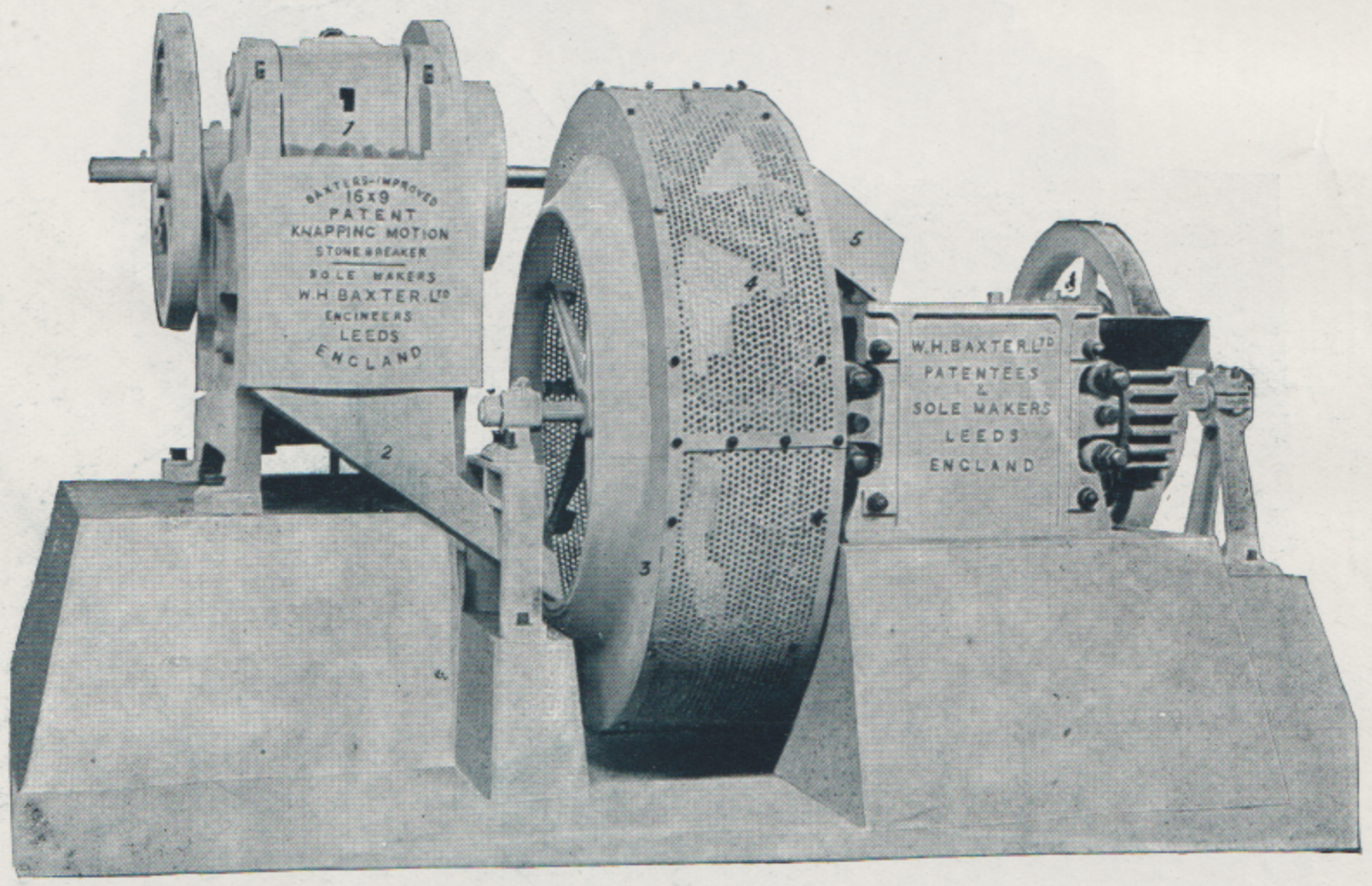
Baxter's Patent Improved Knapping-Motion Stone-Breaker.

Much fuller details of these and other specialities manufactured by MESSRS. W. H. BAXTER, LTD., in conveying, elevating and screening machinery in which numerous novelties of invention and patented improvements are embodied are contained in an admirably got up catalogue, in which illustrations and particulars are given on a more ample scale than is possible within the limits of space at our disposal. The catalogue also includes a list of the numerous awards obtained at the leading Exhibitions of the century, and the principal Corporations and Public Bodies whose orders have been fulfilled, which may be supplemented by the statement of an indubitable fact that Baxter's Knapping Motion Stone Breakers are in use in every quarter of the globe where mining operations and large concrete, dock, harbour or water works are in progress, or wherever the blessings of the macadamised road-making system have been accepted as an aid to civilisation, as well as for railway ballast and many other purposes.

In conclusion we may quote as appropriate to the subject of our sketch the following from "The Implement and Machinery Review," April 1st, 1890:—"MR. BAXTER deserves to be warmly

congratulated for having in the face of much opposition, won the excellent position he holds by sheer single handed perseverance." Very favourable Press Notices in the form of independent reports on Baxter's Patent Knapping Motion Stone Breaker have been inserted in the following journals :—"The Engineer," January 8th, 1886; "Mechanical World," February, 1882; "The Mining World and Engineering Record," July 28th, 1883; "The West Briton," July, 1883; "The Mining Journal," 1884; "The Mining Engineer," September, 1883; "The Cleckheaton Advertiser," September 16th, 1881; "Mining Journal," 1881; and "The British Trade Journal," August 1st, 1885, which states "The best Stone Breaker, judged from the practical work being done on the ground was that of MESSRS. W. H. BAXTER & CO.

The latest of the numerous favourable press notices is contained in a book from the able pen of an expert, Thomas Aitken, A.M.I.M.E., published in 1900 by Griffen & Co., Exeter Street, Strand, London, which deals with the subject in an able and exhaustive manner, indeed, it is a



Baxter's Patent Stone-Breaker, Automatic-feed. Raffwheel Screen, Elevation and Crushing Roll.

work that should hold a place in every Borough or City Engineer's office. After describing other well known stone crushers, the following paragraph occurs :—

> "The stone-breaking machine which has for many years back been extensively used, and proved most satisfactory in regard to breaking capacity, quality of macadam produced, reduced wear and tear, economical working and the small amount of motive power necessary to drive it compared with all others mentioned, is that patented and made by Mr. W. H. Baxter, of Leeds. This stone-breaking machine combines many valuable improvements suggested by practical experience; the portable type of machine, with the automatic screening and loading appliances, has supplied a great want, and at the same time made certain work attainable which with the machines formerly in use was impossible."

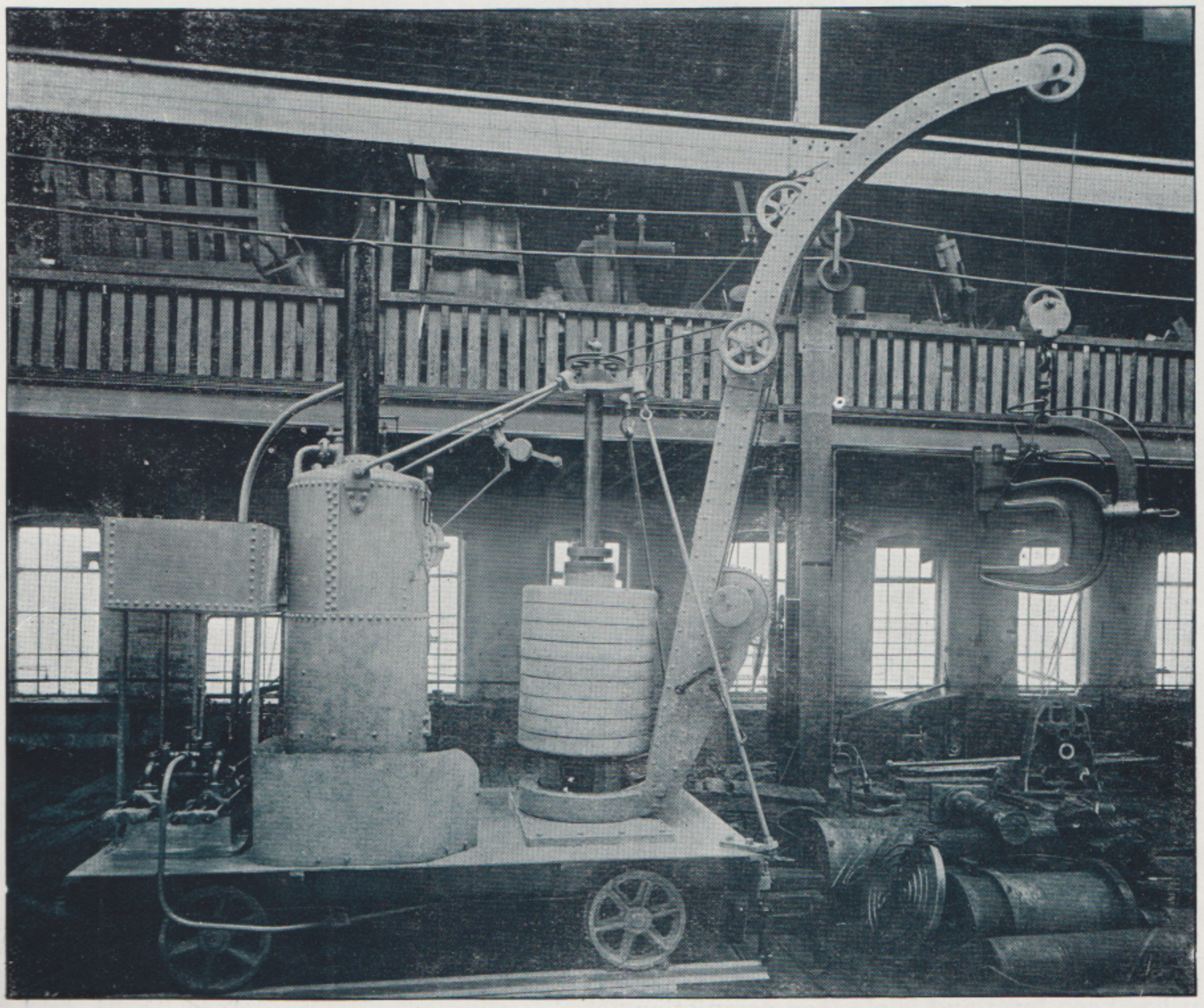
HENRY BERRY & CO., Ltd.,

HYDRAULIC & GENERAL ENGINEERS,

. . Croydon Works, Hunslet, . .

LEEDS.

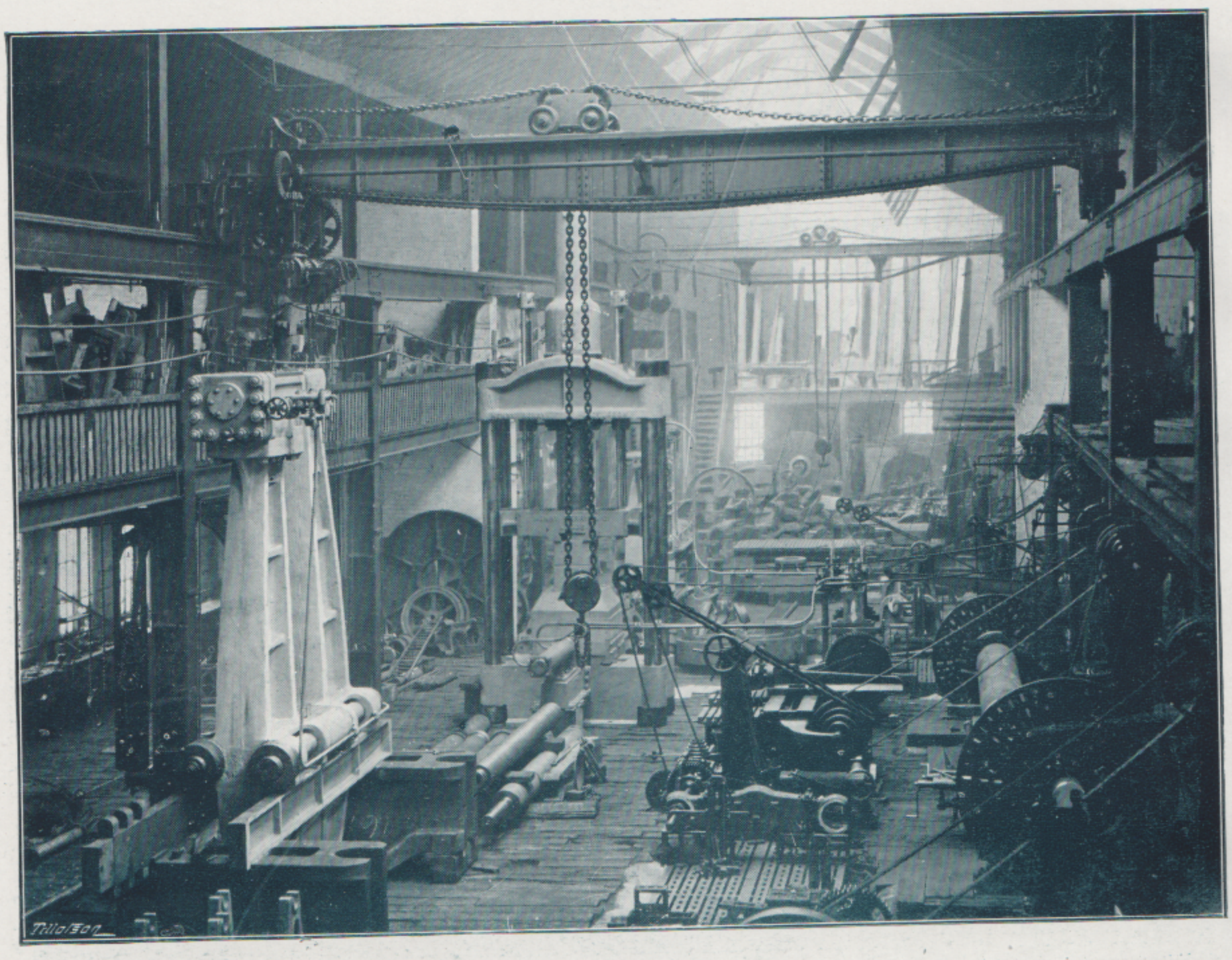
AS makers of Special Hydraulic Machinery and Tools, in general use in the industrial world, few firms have achieved a wider reputation than Messrs. HENRY BERRY AND CO., LIMITED.



Their finely equipped establishment at Hunslet was recently visited by our representative, who is enabled by the courtesy of the Managing Director, to embody in a short review, the following particulars of interest.

The business was first established by Mr. Henry Berry some twenty years ago, and has been so successful that two years ago it was deemed advisable to convert the concern into a Limited Company, with the founder as Managing Director and Chairman of the Board, thus retaining his position at the head of the business so successfully developed by his energetic and skilful management.

So rapid has been the growth of this firm's connection that Messrs. Henry Berry & Co., Ltd., and are now contractors to H.M. Admiralty and War Office, the French, Italian, Brazilian, Turkish and Japanese Government, and have on their books the names of many of the largest



Railways, Docks, Steel and Iron Works, Bridge Builders, Shipyards, Boilers Makers, &c., in this country and abroad.

The works, which have already been extended two or three times, are now found to be too small for the increasing amount of work to be done, and a splendid new machine and erecting shop has been built and is close on completion.

The Croydon Works are situated on Hunslet Moor Side, adjoining the main line of the Midland Railway system, and within a few minutes walk of the Hunslet Station. The Offices, which are situated at the entrance to the works, comprise a building of two storeys, having

accommodation for the timekeeper, and the general store room on the ground floor, whilst on the upper storey are Mr. Berry's private rooms and a well appointed drawing and general office.

The original works consisted of a three-bay shop 140 feet long, the centre bay being 36 feet span, the two side bays having a gallery the full length. This shop was afterwards increased to 280 feet long and is fitted with modern tools of all kinds for dealing with the very heavy castings and forgings, some of them weighing 25 tons each. Many of the tools have been specially designed by the principal and constructed on the works. In this shop are two overhead rope driven travelling cranes of 20 tons capacity, and to each of the columns on the left of the shop are attached hydraulic jib cranes. The space under the right gallery is fully occupied by light

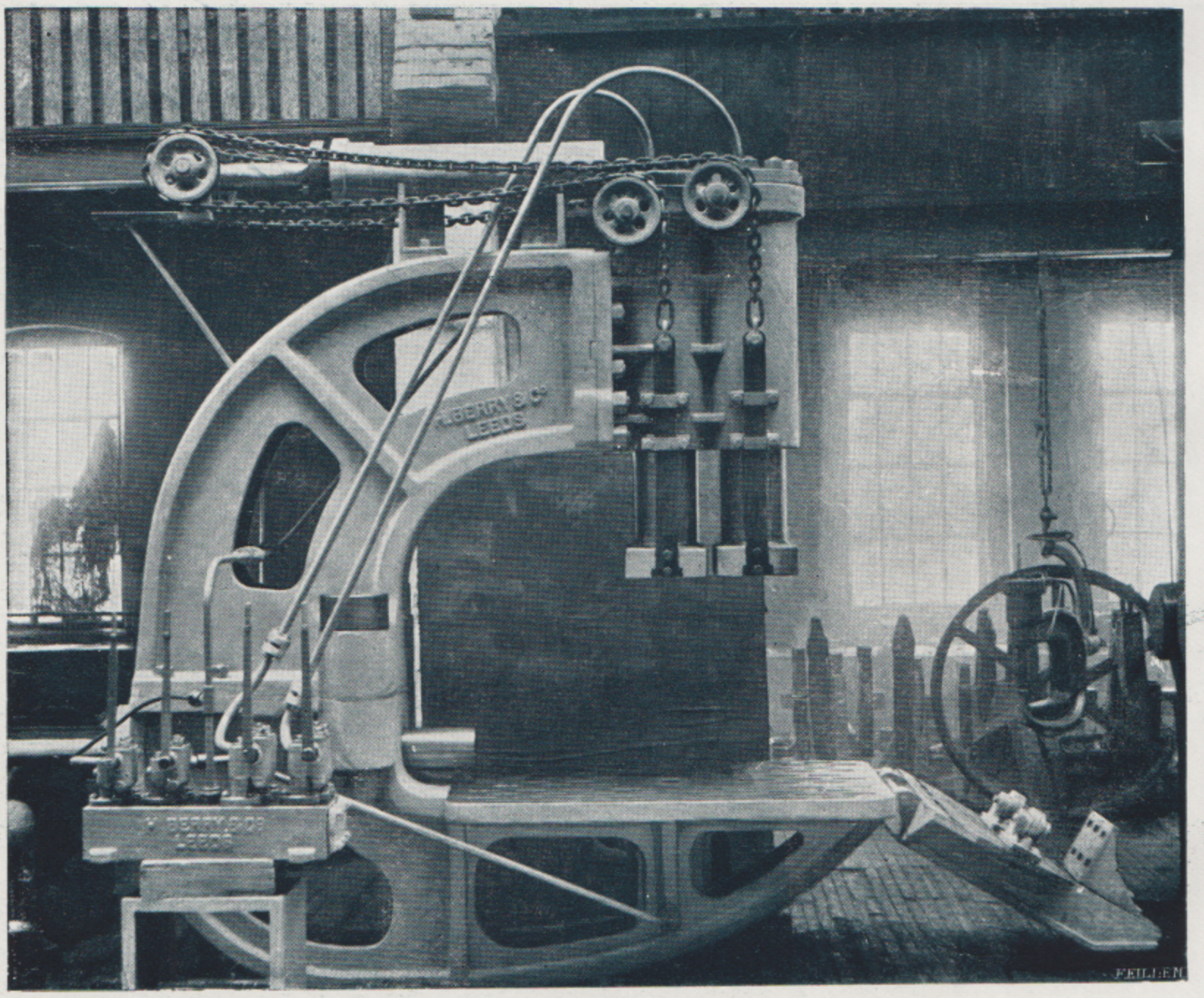
tools, and under the left gallery are fitted the fitters' benches running the whole length. One ot the galleries is devoted to the production of the various hydraulic valves required, and is fitted with a complete plant ot special tools for this work, whilst the other gallery is utilised as the pattern shop and stores.

Subsequently it was found necessary to still further extend, and a splendid lofty erecting shop was added, measuring 192 feet by 40 feet, in which are two electrically driven travelling cranes, one of thirty tons and the other of five tons capacity. These cranes run on separate tracks at differet levels, the heavier crane being able to pass over the lighter one.

The smiths' shop is a corrugated iron building 100 feet by 30 feet, having two light hand travellers commanding the full length of the shop, which also contains a 10-cwt. single-standard steam-hammer, and a number of open fires supplied by powerful fan blast.

The power for driving the machinery is provided by a pair of fine vertical compound engines, constructed by the firm, the steam for which is produced by a Badcock and Wilcox tubular boiler.

The greatest interest of our representative's visit was however centred in the fine pile of buildings now rapidly approaching completion, and which will, when fully equipped with the

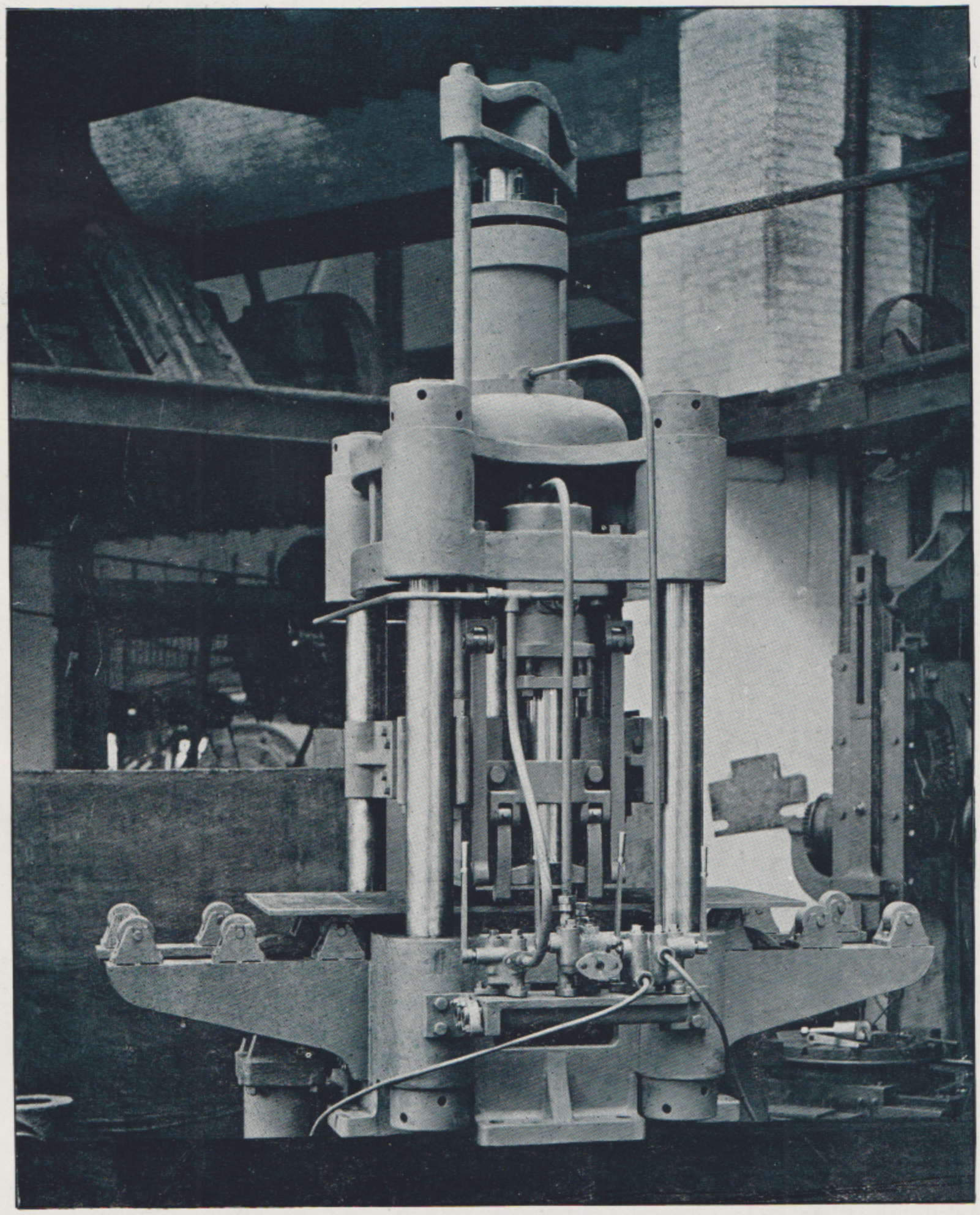


most modern types of English and American tools, at one bound place the firm of Henry Berry and Co., Ltd., in the front rank of engineering concerns of this country.

This fine structure comprises a four-bay shop having a height of 40 feet from the roof to the underside of roof principals, and cover an area of 3500 square yards. The two centre bays have a span of 46 feet and will each contain a 50-tons and a 5-tons electrically driven crane. The two outer bays of 24 feet span, each have galleries running the entire length. All the window frames are of wrought steel and the roof of the two centre bays is almost entirely of glass, glazed on Heywood's patent system.

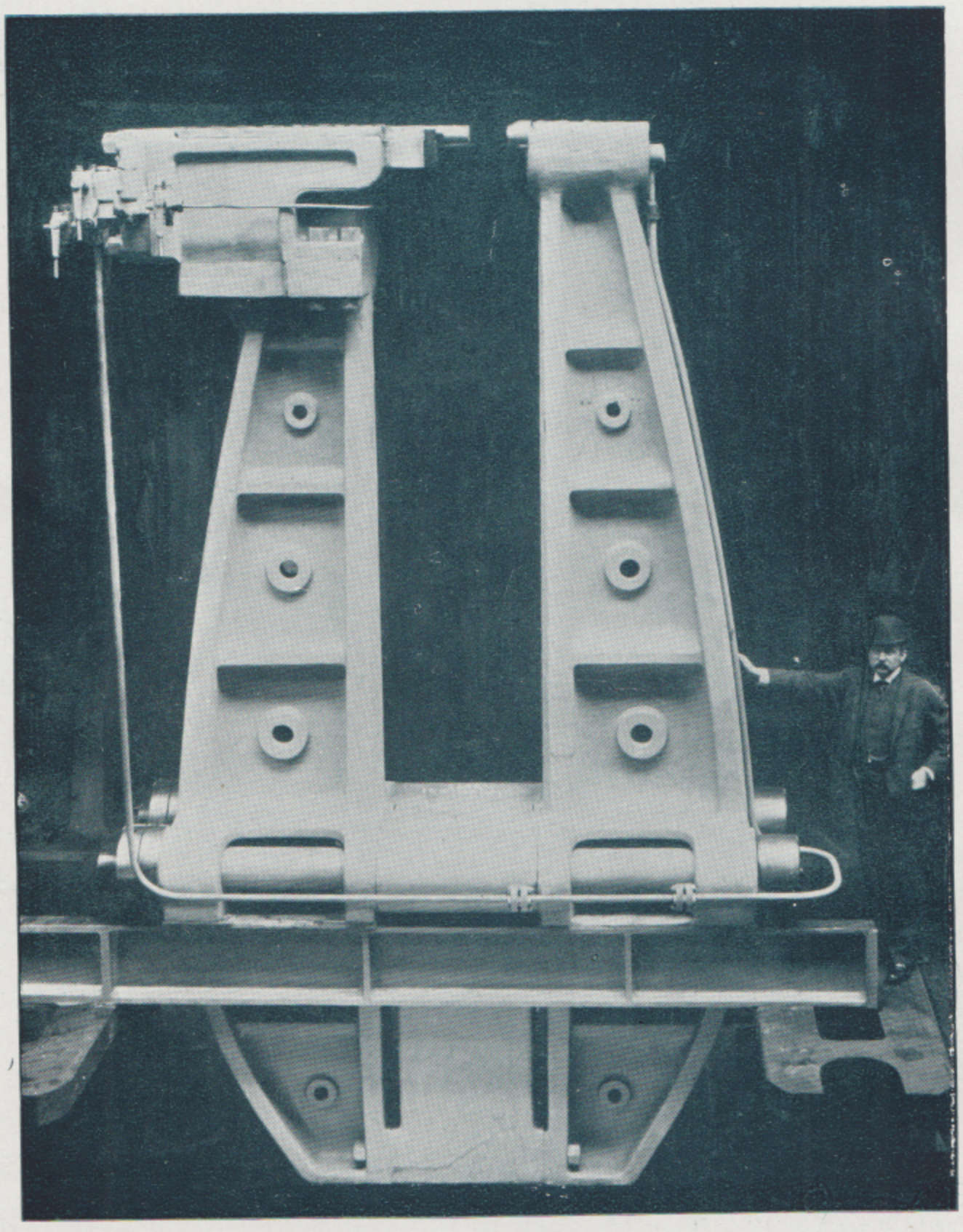
In addition there is also the power house (containing a pair of vertical compound engines and a 100 killowatt dynamo supplied by the British Thompson Houston Co., Ltd.), a boiler house and tool shop.

The productions of this firm are too numerous to be given here, but include hydraulic installations for all purposes, steam, electric and belt-driven pumps, accumulators, intensifiers,



hydraulic forging plant up to 5000 tons capacity. All kinds of flanging presses, wheel bossing presses, keel or garboard bending machines, hydraulic and electric cranes, hydraulic rivetting machines from 13 feet gap with a pressure 130 tons on the rivet to the smallest portable machines. Hydraulic punching and shearing appliances. Plants for steel and iron works and other industries requiring powerful appliances of similar description.

When visiting the offices, our representative had an opportunity of inspecting numerous photographs of the more important machines turned out by the company, a few of which we reproduce together with views of two of the shops.



HATHORN, DAVEY & CO.,

MANUFACTURERS OF PUMPING ENGINES FOR WATERWORKS,

Sun Foundry, Dewsbury Road,

. . LEEDS. . .

Telegraphic Address: "HATHORN, LEEDS." Codes: A.B.C. (4th Edition); Universal Mining Code.
. . National Telephone: No. 524. . .

MANY of the most noteworthy improvements in design and construction of pumping plant for waterworks, collieries, &c., effected within the past half century have had their origin, or have been practically perfected at the Sun Foundry, an establishment that has supplied some of the most powerful machinery of the kind now in use—whether Abroad or in the United Kingdom—and among which may be mentioned the South Staffordshire Mine drainage engines, one of which will raise 20,000 tons of water per day, 300 ft. high.

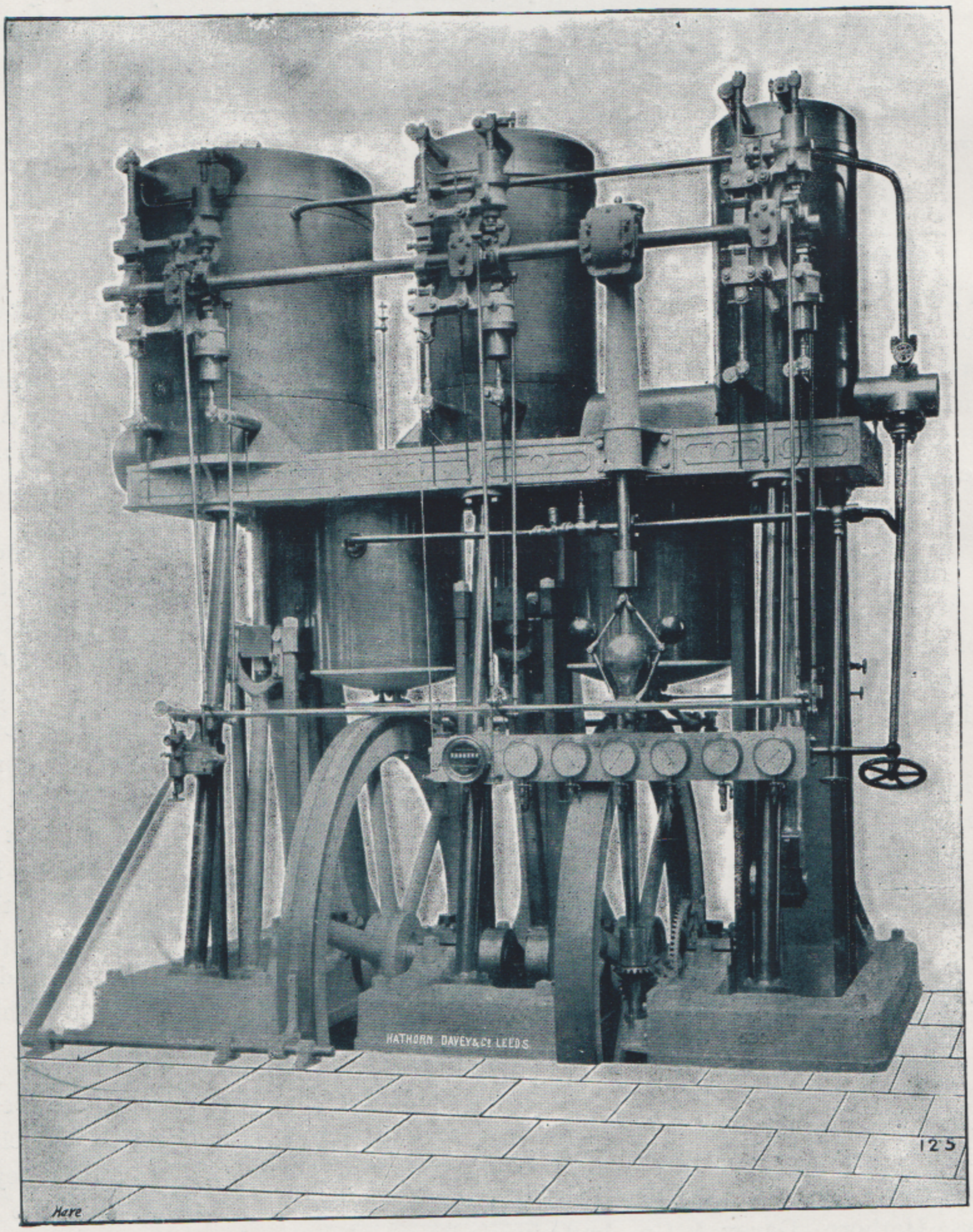
The history of the business dates back to some fifty years ago, when the concern was originally started by a firm named Messrs. Carrett & Marshall, who traded under that tit'e for about twenty years. The first-named gentleman was evidently gifted with ideas far in advance of his time, having invented among other machines a steam road motor car to seat eight persons. This was constructed to act without noise or smell and attain a speed of fifteen miles an hour, but owing to an act prohibiting such vehicles travelling at over four miles an hour it was stopped by the authorities, and Mr. Carrett's ingenious invention remained in comparative obscurity. We believe the owner subsequently gave or sold this car to a gentleman in London named Hodges, and that it continued to run for years in that district. About thirty years ago the Sun Foundry passed into the possession of the late Colonel Hathorn and other gentlemen, and shortly afterwards Mr. Henry Davey joined the firm. From that time may be said to date the prominence of the firm as manufacturers of the speciality in pumping machinery and allied hydraulic plant with which they have since been intimately identified, and for which the establishment has been completely equipped to supply thoroughly solid and good work at reasonable prices.

The firm are makers of nearly all classes of pumping engines both of the direct acting and rotative type, for waterworks and colliery use and in view of a certain proverb relating to prophets, it is interesting to note that the fine pumping engines fixed at Headingley which supply the upper parts of Leeds with water, are of their make. At the time of the writer's visit Messrs. Hathorn, Davey & Co., had six similar engines on hand, all of which he was informed were going abroad, and he also saw several large engines building in the shops, some of which were for English waterworks and mines and others for exportation.

A very complete description of the various types of pumping machinery, with full technical details and illustrations of the specialities briefly referred to, are incorporated in the

handsome and compendious catalogue issued by Messrs. Hathorn, Davis & Co., which also contains interior views of the principal departments of the works, of which mentioned is made in the concluding portion of our notice. A separate catalogue is published of pumping machinery for mines, in which several improved types of engines of special design for that purpose manufactured by the firm are similarly described and illustrated.

The Sun Foundry is situate in the Dewsbury Road, to which the premises have an extensive frontage of about one hundred and twenty yards.



HEADINGLEY PUMPING ENGINE.

The plant includes every modern appliance and machine tool designed to ensure the perfection of accuracy and reliable workmanship for which the machinery turned out at the Sun Foundry enjoys world-wide celebrity. The firm it should be added are on the Admiralty, War Office and Colonial Lists of Government Contractors.

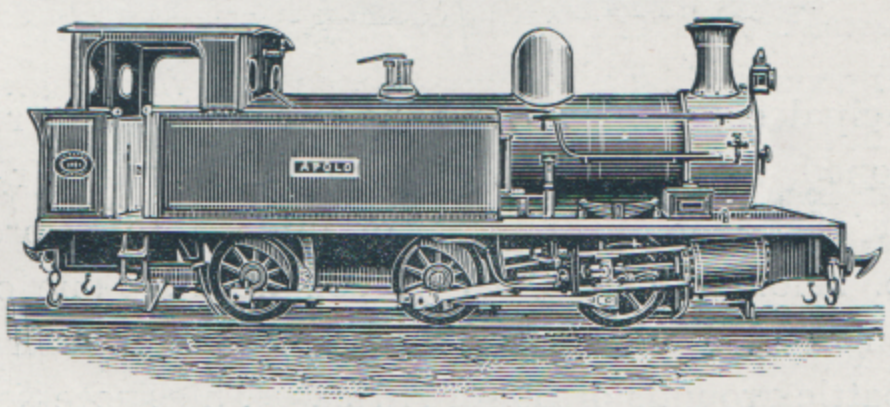
MANNING, WARDLE & Co.,

The Boyne Engine Works,

Telegraphic Address:
MANNING, LEEDS."

Jack Lane, Hunslet, LEEDS.

NOTWITHSTANDING the pessimistic views entertained by a few of the more dispairing critics of British industrial progress—more especially in connection with the locomotive engineering branch—the fact remains that our English representatives are still turning out, and will continue to produce, the best and soundest workmanship in this class of machinery that claims pre-eminence in the markets of the world.



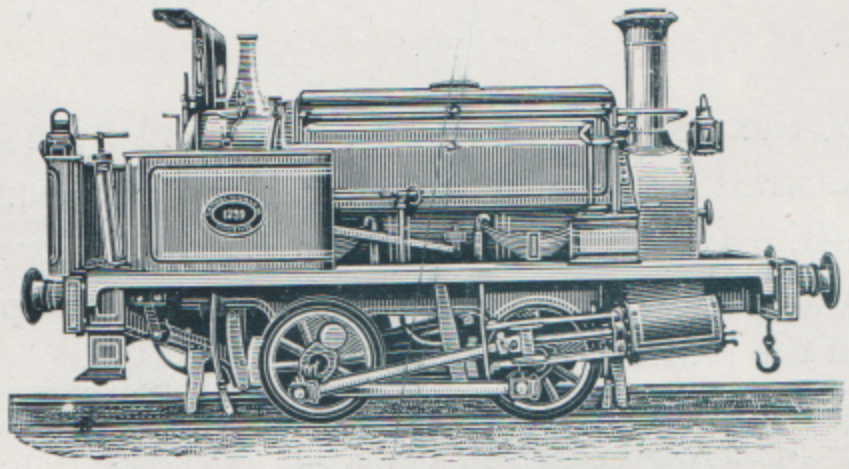
As one of the leading centres of this important department of engineering work, Leeds has long since won recognition at home and abroad, and has contributed its full proportion in the enormous extention of railway facilities that has proved the great factor in the development of the peaceful arts of commerce and the spread of civilisation within the closing half of the Nineteenth Century.

Among the firms who rank with the oldest makers of locomotives is that of Messrs. MANNING, WARDLE & CO., of the Boyne Engine Works, who, as long ago as 1862, gained the Prize Medal at the London Exhibition for a locomotive engine, thus distinguished "for excellence of workmanship and adaptation for the purpose for which it was constructed." The business was originally founded in 1858 by Messrs. John Manning, Charles W. Wardle and Alexander Campbell, of whom the first-named died in 1874. At this time, Mr. Edwin Wardle, son of the above was then admitted a partner, although the title of the firm remained unchanged, and since the death of his father, ten years ago, has had the sole ownership of the concern.

The Boyne Engine works occupy an area of about five-and-a-half acres with an extensive frontage to Jack Lane, Hunslet, the premises running alongside the Midland Railway, a siding from which connects direct with the yard. In the front portion are the well arranged general and private offices with accommodation for the staff of draughtsman engaged in getting out the various designs. The buidings for the works department are of substantial construction and include a large forge, boiler sheds, erecting shops, fitting and machine shops, smiths' and pattern shops and stores, conveniently arranged to provide facilities for the operations of a business employing between five and six hundred hands. Where necessary the shops are fitted

with powerful travelling cranes, and the mechanical equipment throughout the works embraces the latest and most improved plant of labour-saving tools and appliances designed for expediting the output and minimising the cost of production. Motive force for the numerous machines is supplied from five powerful steam engines erected in various parts of the works, fed from the large boilers placed in a separate building.

As previously suggested at the beginning of our notice, Messrs. Manning, Wardle & Co. make a special feature of the manufacture of locomotive engines of various types for home and foreign requirements, in which they have introduced some noteworthy improvements during their long connection with the trade, and have fulfilled important contracts for her Majesty's



Government and the principal companies from time to time in all parts of the world. The firm, it should also be mentioned, may also claim distinction in another and quite different field of activity, and in the light of recent events it is of interest to record the fact that to Messrs. Manning, Wardle & Co. belongs the honour of constructing one of the first armoured locomotive engines, a weapon of modern warfare, now undergoing a practical test of its usefulness in the hardly contested battle grounds of South Africa. The successes already achieved in this campaign will in all probability lead to a more extensive adoption of these movable forts as the stern necessities of war demand, and if such should be the results of practical experience, it will afford substantial gratification that such engines owe their inventions to a Leeds firm who possess the amplest resources for supplying the requirements of our military authorities in the nation's hour of need.

IN contemplating the progress of the "Divine Art" of printing and its allied industries in a New Century review, no more striking feature presents itself than the marvellous development of the more artistic branches of Illustrative and Decorative printing comprised in many of the specialities produced by Petty & Sons, Ltd.

MACHINERY ANNEXE—LETTERPRESS SIDE.

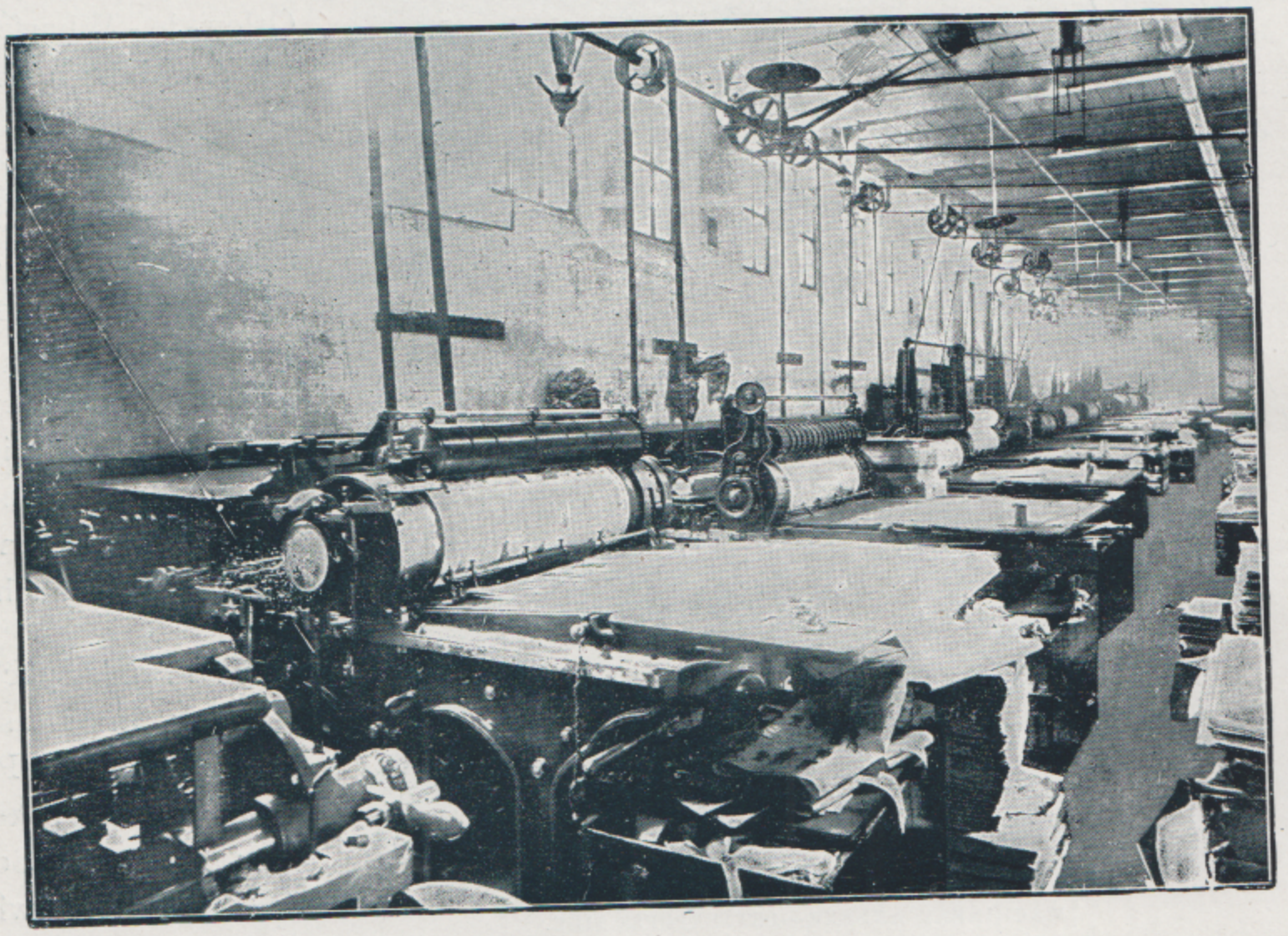
In the early thirties, the founder of the Company, (the late Mr. J. W. Petty), learnt printing under the old regime, at the *Leeds Times* Office, that newspaper was then printed at hand press. Later on in the early sixties the present Chairman of the Company, Mr. Wesley Petty, was apprenticed at Otley-in-Wharfedale, with a firm, who, although in a large way of business, were still doing all their printing by the same old-fashioned hand presses; contrasting that with the marvellous array of machinery of the finest type, American, Continental, and English, now giving employment to four hundred busy artizans at Whitehall Printeries, Leeds, it speaks volumes for the enterprise and genius that in one life-time has been enabled to achieve so much.

The firm's specialities in Fashions printing in Illustrated Commercial Printing and in Pictorial Posters are now favourably known all the world over. Petty & Sons were known as the "Printers with Ideas" thirty five years ago, and may fairly be called the "Pioneers of Illustrated Advertising." When it is considered that this form of advertisement is essentially of modern origin, fostered by the spirit of enterprise which finds in pictorial productions a channel of publicity unapproached in effectiveness by any other method,

it will readily suggest the secrets of its popularity with up-to-date tradesmen, who are thus provided with the most attractive system yet devised for drawing attention to their wares. The remarkable progress of the firm of Messrs. Petty and Sons, Limited aptly illustrates the forcefulness of the old adage "Small beginnings or the way to get on," and notably emphasises the success achieved. The business originally started by them in 1865, on a very humble scale, the entire plant then comprising of a small hand press and a few cases of type,

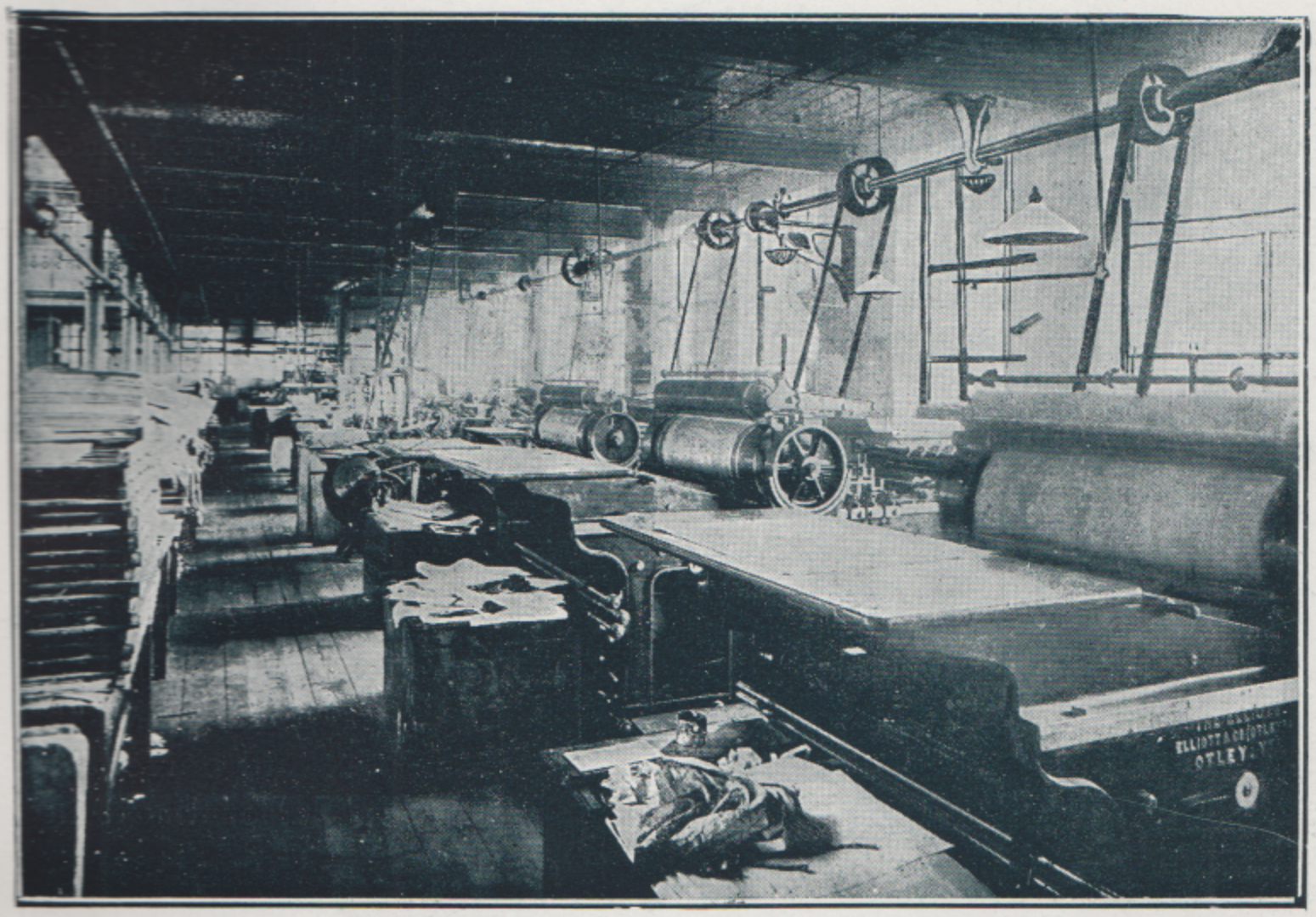
MACHINERY ANNEXE—LOOKING WEST.

has since been developed to its present magnitude by the strenous energy of its proprietors, who in their own special department as advertising and colour printers may justly claim world-wide prestige wherever the many-sided resources of the Caxtonion art have been utilised with this object. The firm finding it necessary to provide more commodious accommodation for the large business thus built up, in 1888 erected the extensive block of premises styled "The Whitehall Printeries." This model establishment specially designed for printing occupies a spacious and convenient site at Holbeck Junction, the main building having an extensive



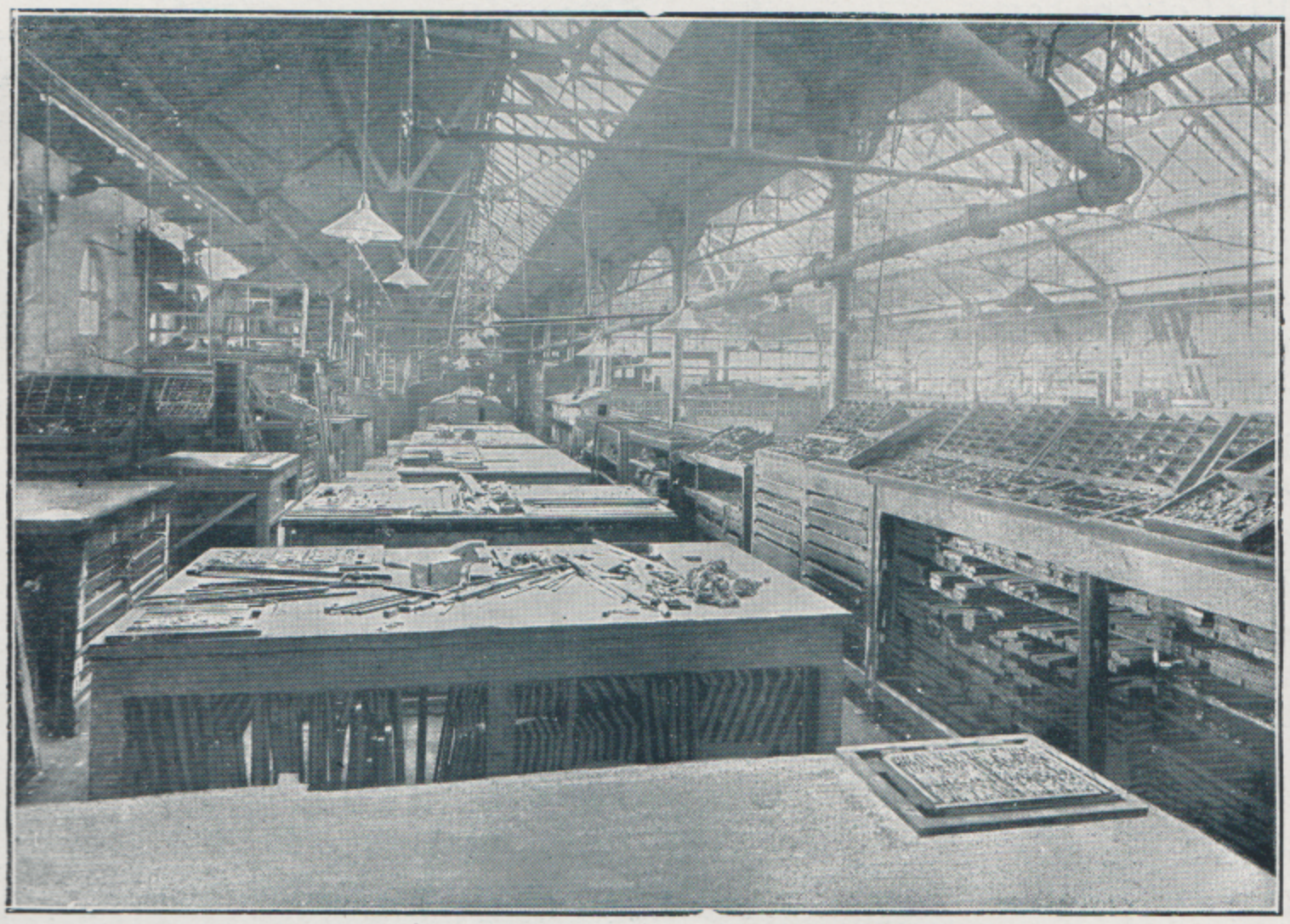
LETTERPRESS MACHINERY WING—LOOKING EAST.

frontage overlooking four of the trunk railways entering Leeds, and consisting of a light and substantial structure in brick and stone, surmounted by three dormer windows, the centre rising higher than the others, and containing a fine illuminated clock with dial 6 feet in diameter, a familiar and exceedingly convenient local land mark. The interior arrangements have been admirably designed to meet the requirements of the various departments which include letter-press and lithographic printing, binding, manufacturing stationery, photo-zincography, photo-litho and color-type printing in all branches by the most up-to-date methods known.



COLOUR-TYPE MACHINERY—SOUTH GALLERY.

Since 1888 a large wing has been added for Litho and Picture Poster printing. The rapid growth of every branch of their business is necessitating further extensions for which the firm have recently acquired an adjoining plot of ground. The picture poster machinery includes seven mammoth litho machines, built especially for picture poster work, each capable of taking in sheets measuring 65 by 45 inches. The other litho machines of the newest type include 18 in all.



THE CASE GALLERY—POSTER DEPARTMENT.

The letterpress machinery includes reel machines, capable of producing 50,000 two colour bills in one hour, Dawson's new perceler machines, running 1,800 to 2,000 per hour, down to the new Falcon Platen machines, which are free from the danger attached to Platen machines or an ordinary type, and running at more than double the speed of Platen machines (built ten years ago), together with new style Wharfdales for Heliochrome printing, 2-colour machines and perfectors, amounting to fifty-two letterpress machines in all. In this department it is no uncommon sight to see 12 machines running at one time upon the Excursion Posters of the North Eastern Rly. Co., for whom Petty & Sons have been contractors for over a quarter of a century. The facilities are of such an extent that orders received in the letterpress department for a half a million of folio two-colour bills can be put on goods rails the same night.

A CORNER OF THE CASE GALLERY.

THE PICTORIAL POSTER ARTISTS' ROOM.

The labour saving machinery in other departments is of a most interesting character. Rows of folding machinery, each one attended to by a smart operator, enables the girl to do four times as much as by the old fashioned hand folding. One of their book-stitching machines, a

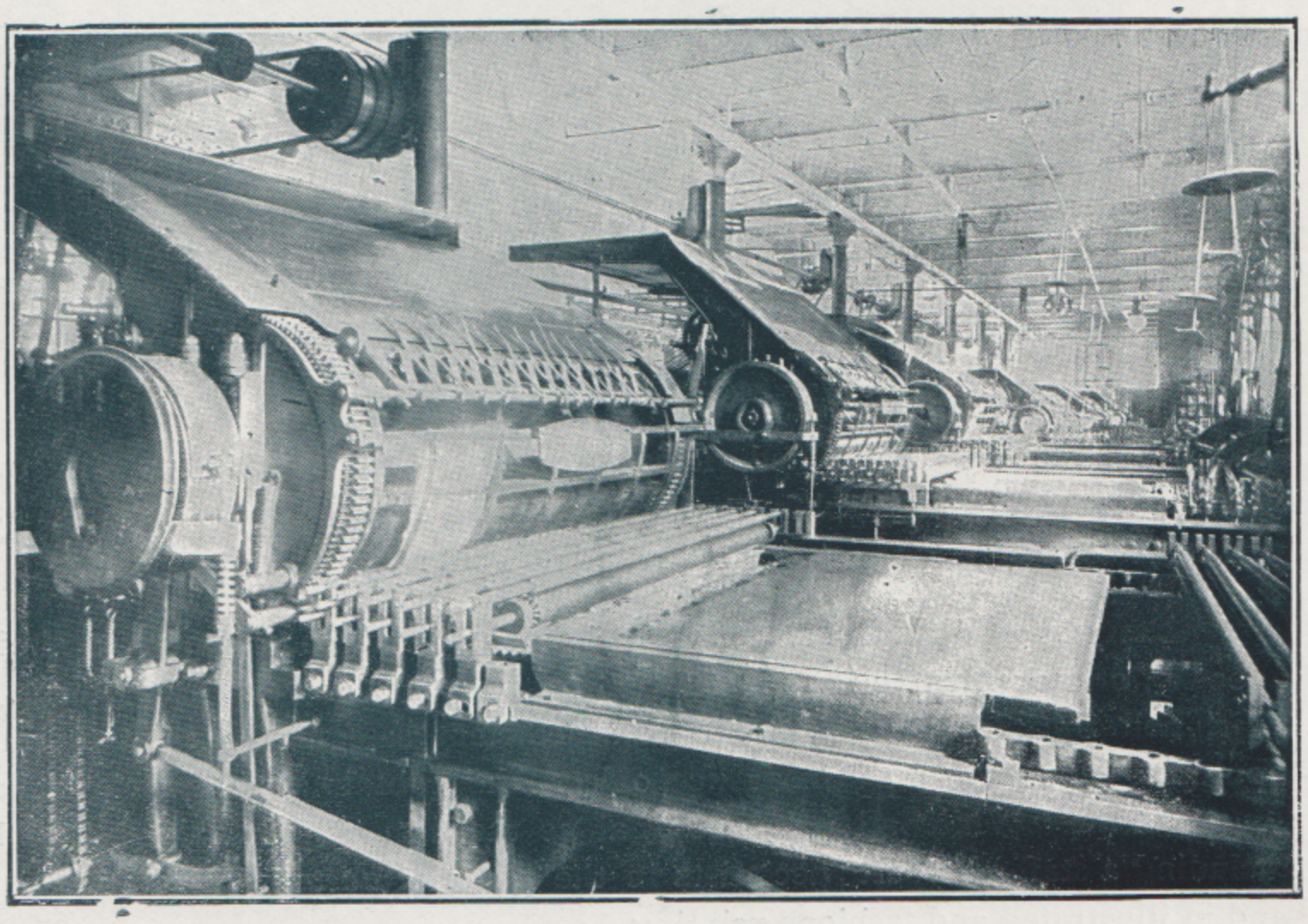
"Smyth" American stitcher, struck us as being the most ingenious machine we have ever seen, for it stitches the flimsiest paper up to the most expensive hand made account book of mammoth size.

A SMALL BIT OF THE TRANSFERRING-ROOM AND LITHO STONE STORES.

The Counter-check book machinery seems to print from a reel of paper rule blue lines, number in three places, perforate and fold, and cut off all at one operation, truly a marvellous affair.

Upon the many tons of stones and plates stowed away in large fire-proof store rooms, there are the artistic designs for illustrating every department of trade which has made Petty & Sons so famous.

The motive force for the machinery at Whitehall Printeries is furnished by a splendid engine called the "Union Jack," 250 horse power, built by Messrs. Perkin and Co., Junction Engineering Works, Leeds.

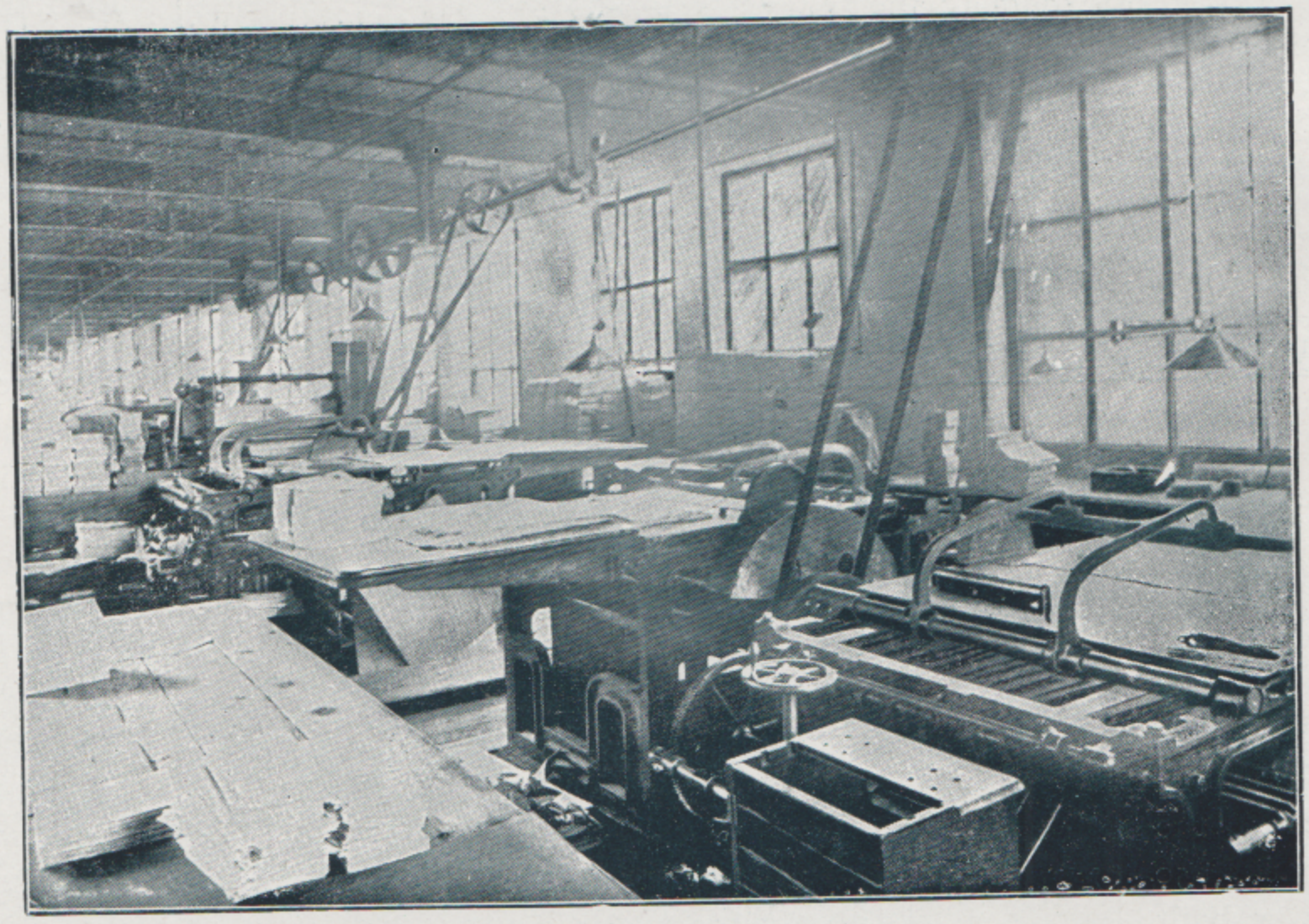


PICTORIAL POSTER MACHINES—LITHO DEPARTMENT.

The Establishment is lighted throughout by an electric installation recently added by Alfred Sykes of Huddersfield, together with a fine new dynamo, illuminating every part of the large works, and driven by a separate engine built by Ransome, Sims and Jeffries, Ipswich.

One of the most interesting features of the Printeries to which attention was directed on the occasion of our visit, was an immense stock of pictorial posters, suitable for advertising every class of business; this stock always amounts to several thousand pounds worth of artistic pictures, thoroughly up-to-date, and which are supplied to customers in all parts of the world, either direct from Whitehall Printeries, or from their branches in London, Reading, Belfast, Melbourne and Cape Town. The firm do a large shipping and export trade in addition to having over 8,000 customers upon their books in Great Britain and Ireland, the whole of which is covered by their own representatives.

An event well within the remembrance of our local readers was the fire which devastated the firm's paper warehouses in April 1898, the works being saved from total destruction by the iron-proof doors dividing these departments from the main buildings, and although this portion of the premises were completely gutted, and some thousand pounds worth of stock, both printed



AMONGST THE BOOK FOLDING MACHINES.

and unprinted, was consumed, it is noteworthy that owing to the unflagging energy of Mr. Wesley Petty who is solely responsible for the conduct of the business at these headquarters, work was continued without any interruption whatever.

Petty and Sons have since adopted ample precautions against a similar outbreak by the adoption of the "Grinnell Sprinkler" throughout all the works and offices. They consider this "Grinnell Sprinkler" system the most efficient safeguard extant against fire, and as it is approved by the leading insurance offices, they obtain considerable reductions in premiums.

At the "Whitehall Printeries" alone the firm employs about four hundred workpeople, including a staff of expert specialists in the pictorial poster and colortype printing departments and in illustrated and fashions printing.

They have also developed a largely increasing trade as commercial printers and manufacturing stationers, having a very complete binding and account book manufacturing department. As they compete very keenly in these and in every branch of colour printing and

stationery, their estimating department forms no small or unimportant part of their clerical staff. The "Whitehall Printeries" has been for some years under the personal supervision of Mr. Wesley Petty, the Chairman and senior Managing Director. Mr. Benjamin Petty, Managing Director residing at Reading, has charge of their Southern Printeries in that town, where, in 1894, Messrs. Petty & Sons determined on an extension of their business in an entirely new field of enterprise. The facilities at Reading (employing 200 workpeople have been rapidly developed the combined facilities afforded by these two extensive concerns enabling the firm to undertake contracts of a very notable character. Additions to their machinery are constantly being made to keep pace with the increasing demands in each department. The solidity of the business as a whole is evidenced by the increase of trade by leaps and bounds, both establishments affording veritable examples of busy hives of industry, and substantially representative of the most advanced ideals of modern enterprise.

In the year 1894 the business was converted into a limited company of a strictly private character, no shares being offered to the public, but since adopting the shareholding principle, while resolutely refusing money from outside they have given encouragement to their employees to acquire shares on advantageous terms, whose interest in the firm is consequently of a personal nature, tending to promote the greatest good will and determination on the part of the work-people to make the special productions of the house "familiar as household words" all the world over. Visitors are always sure of a cordial welcome at Whitehall Printeries, and it is an intellectual treat of no mean order to be shown over the works by the Managing Director, or by one of his intelligent sons whose description of the facilities—en route—tends to show the vast comprehensiveness of their ever increasing trade.

The works are about eight minutes walk from the centre of the City, but the tramcars from thence pass Whitehall Printeries every five minutes, and we recommend our readers to pay an early visit to this interesting spot.

HILTON & HILTON,

: : THE PIANO FACTORY, : :

Saville Street, Wellington Street,

LEEDS.

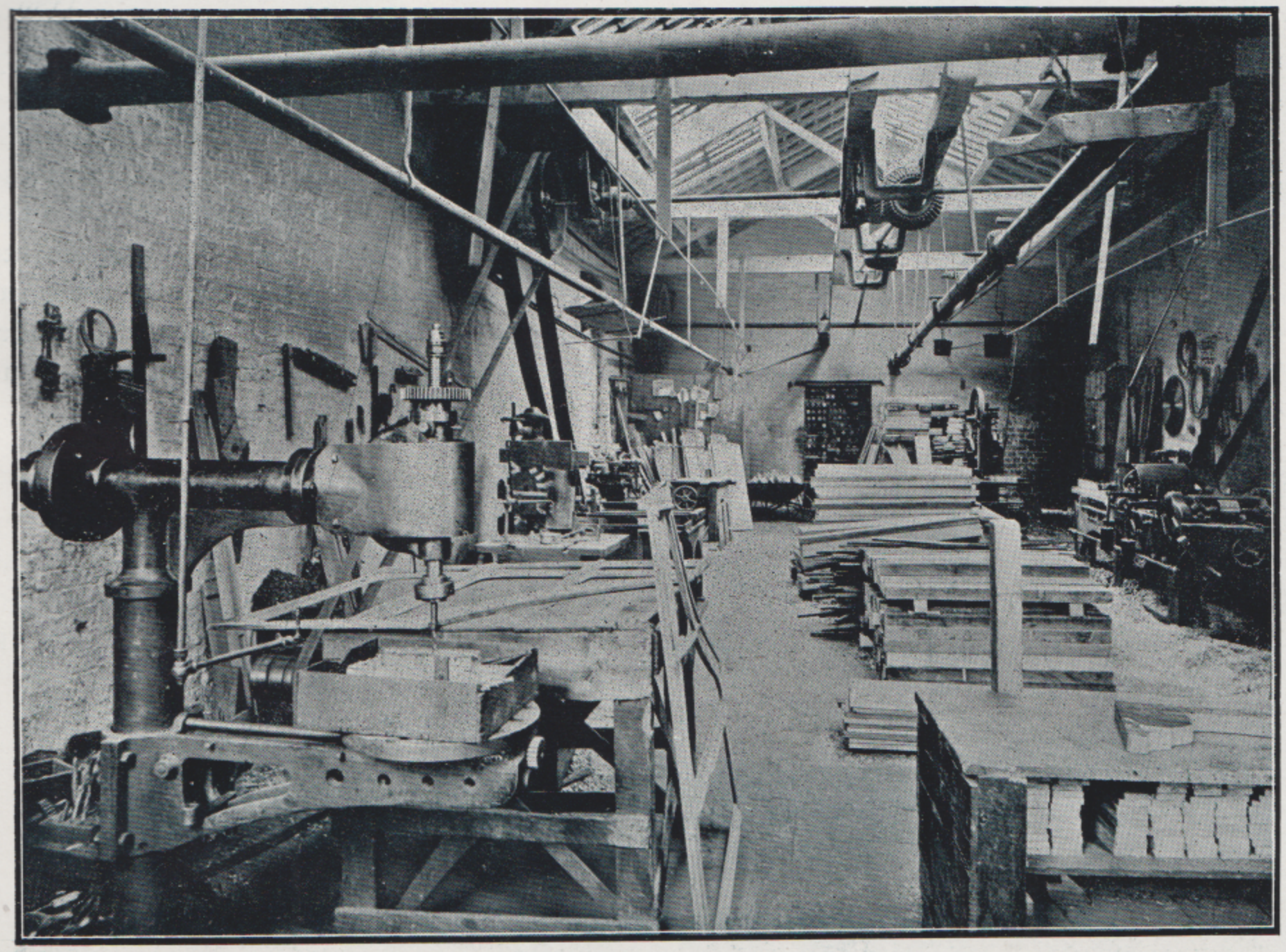
STRIKING as are the contrasted industries of the West Riding capital as described in the pages of our work, Leeds may yet claim an important and more recent addition to its varied branches of manufacture in the Piano Factory of Messrs. Hilton & Hilton, a firm whose name is familiar with music lovers of all grades throughout the North of England.

CASE-MAKING.

The history of the progress of the business affords another illustration of a big success sprung from small beginnings, furnishing also additional proof of the indomitable energy and spirit of enterprise which characterise the natives of the premier county in their undertakings. Originally founded by two brothers Hilton at Ravensthorpe, near Mirfield. the business speedily outgrew the limited accommodation of the premises then occupied, and with a view to a more central

location the firm acquired the extensive site where the new piano factory was erected some ten years ago. That the move was judicious and well timed has been amply justified in the enormous development of the concern which now ranks as the largest pianoforte manufactory in the Provinces.

Before entering upon the details of the arrangement and equipment of the building, we may refer to another important change in the firm, the business having within the past year or so passed into the possession of Mr. Arthur Jones, a gentleman hailing from York, who has since been joined in partnership by Mr. William B. Goodrick, and under the new regime, although still retaining its old familiar title and pursuing the same enterprising policy, the concern has entered upon a fresh lease of prosperity and progressive development. The site occupied by

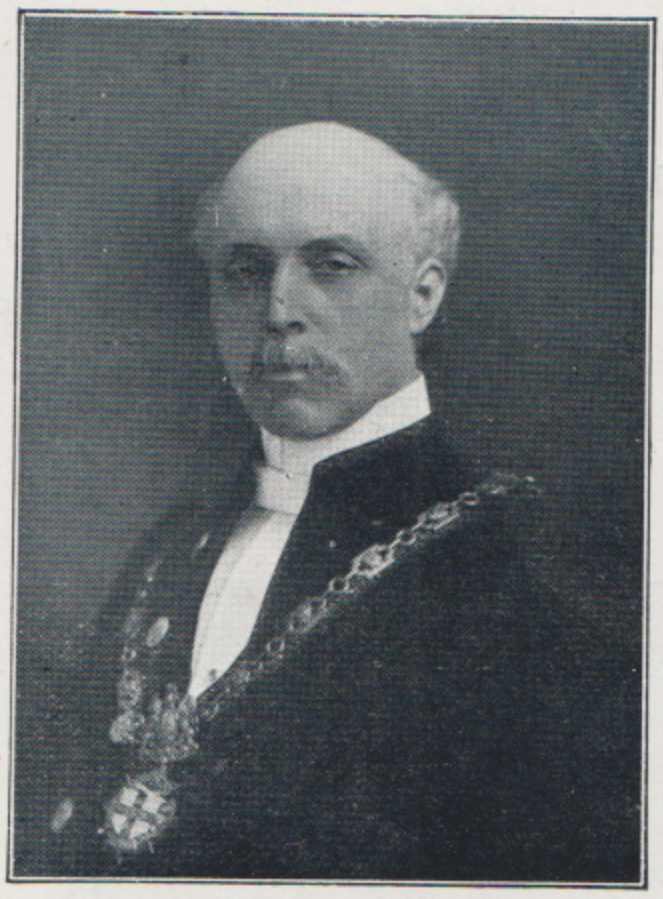


PLANING, TENONING AND DRILLING MACHINES.

the premises is central and conveniently adjacent to the termini of the principal railways, covering a large plot of ground extending from Saville Street into Castle Street, the main building having an elevation of four storeys to the first named thoroughfare close to Wellington Street. The frontage is of substantial appearance and handsome proportions, the ground floor being occupied as general and private offices to the rear of which are store rooms for veneered parts, ironmongery and fittings incidental to the construction of a modern piano.

By the courteous permission of the proprietors we were enabled to pass through the different sections of the factory commencing by a subversion of the usual order on the uppermost floor of the building. Hither we were conveyed in a powerful lift constructed to carry materials, &c.

from the bottom to the top of the factory, and here we found a numerous staff of artizans busily occupied in veneering, sound board, back and packing-case making, this also including general joinery required in the works. Descending to the floor below we enter another spacious apartment where the processes of action making, fitting-up, carving, gilding polishing and other finishing touches are imparted to the instruments before being passed on to the tuner's hands. This exceeding delicate work is carried out only by experts possessed of the fullest technical knowledge and an absolutely accurate ear, by whom each piano is regulated, "toned," fine tuned and finally examined before entering the show-room, which provides accommodation for some two hundred instruments of all grades. Here we had the pleasure of inspecting and making a practical test of the firm's highly artistic models with many recent improvements, for which the manufacturers justly claim the superiority both in casework and tone to any British or Foreign piano produced at the price. From the specimens on view we readily endorse the high commendation accorded to Messrs. Hilton's instruments by the leading organs of the trade press, amply confirmed as that verdict has been by the voice of the musical public, whose unanimously favourable opinion of the firm's pianos is best expressed in the continuous increasing sale of the instruments.



MR. ARTHUR JONES, J.P.,
Sheriff of York, 1900.

POLISHING DEPARTMENT.

Returning to the ground level, we next enter the large drying rooms where the various woods are treated before using, the current of hot air being derived from a fan connected with the boiler and engine rooms, the latter furnished with two fine engines each of 40 horse power which supply driving force for the machinery in the various departments. Next to this is the wood-working shop, equipped with complete modern plant for sawing by hand, circular and other benches, tenoning, boring, moulding and shaping machines, and adjoining is a store-room for bracing, panels, trusses and mouldings ready to be finally polished and finished as required. Passing the japanning stoves, fitted with racks for drying the parts submitted to this process, we enter a spacious room specially arranged for the large stock of veneers in every description of fancy woods, where customers can select any pattern or shade when ordering an instrument.

MR. W. B. GOODRICK.

The entire arrangements are admirably ordered throughout in the various department of the manufactory, close supervision of the principals being exercised, and no effort being spared to maintain, and if possible, enhance the high reputation established by the Hilton pianos, essentially the instrument of the day.

A well got up illustrated catalogue is issued by the firm, containing numerous drawings of their leading specialities in elegant Chippendale, carved and inlaid cases, ranging in price from the "Style O," at 40 guineas, to the beautiful drawing room grand "K4," at 75 guineas, justly pronounced the "Premier Piano of the day." As indicating the extensive resources of the establishment, it may be stated that the main building alone has a floor space of over 23,000 feet, totalling in the whole of the premises nearly 39,000 feet.

JOSEPH KAYE & SONS, Ltd.,

. . Hunslet, LEEDS . .

AND 93 HIGH HOLBORN, LONDON, W.C.

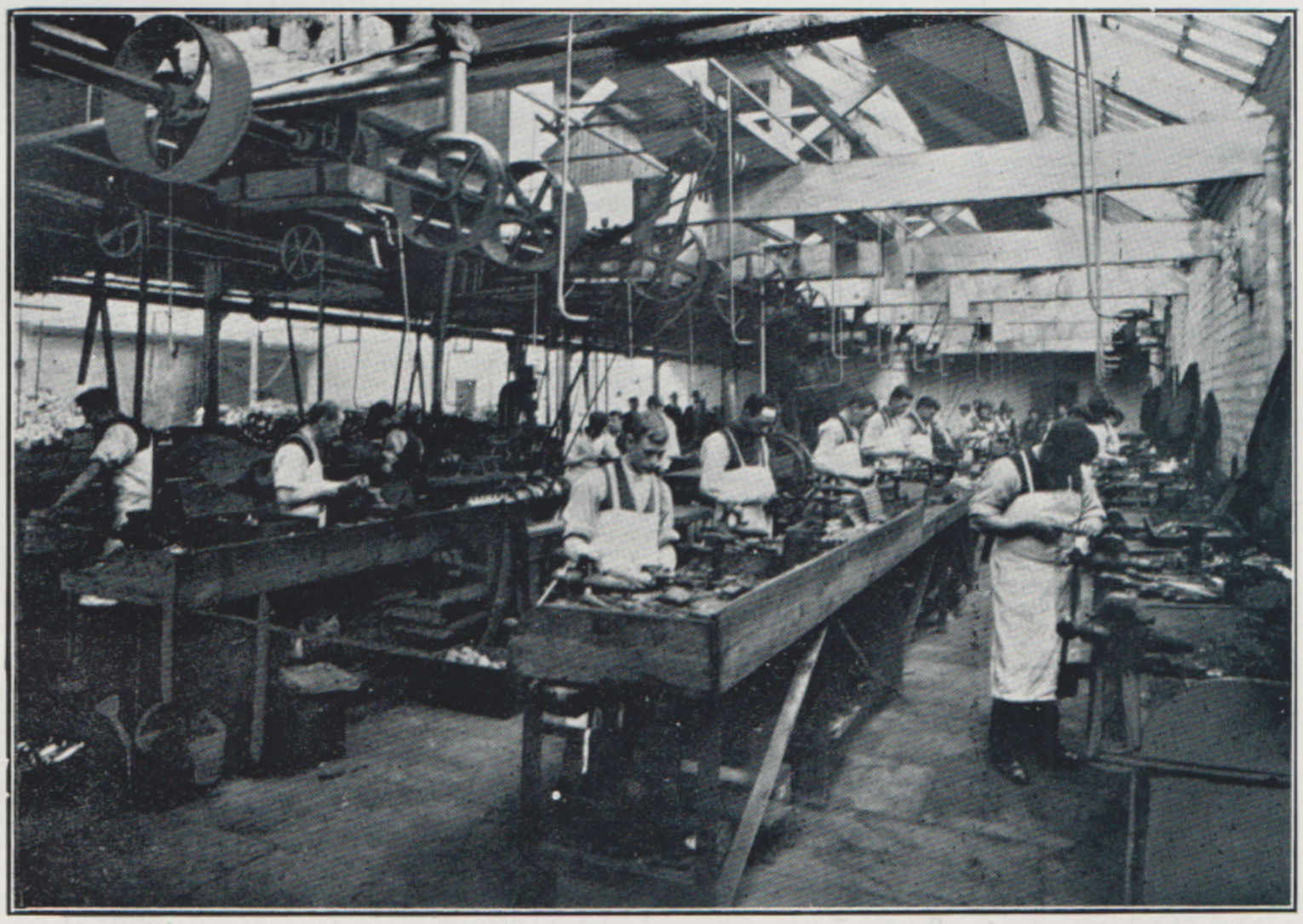
THE infinite diversity of Leeds industries furnishes few more interesting features than those presented in a recent visit paid to the establishment of Messrs. Joseph Kaye & Sons, Limited, whose name is of world-wide celebrity as the inventors, patentees and manufacturers of locks in daily use by thousands for every purpose of utility to which this form of mechanism can be put, from the smallest article for cabinet furniture to the impregnable appliance designed for the safe guarding of the criminal or lunatic, or for the safety of the countless millions of railway travellers at home and abroad. Before entering upon a more detailed description of the more prominent of these remarkable inventions, we may be permitted at this

PATENT SAFETY RAILWAY CARRIAGE DOOR WEDGE-LOCK DEPARTMENT.

stage of our notice to give some particulars of the rise and progress of the important concern, now one of the largest in its own special line in the kingdom.

Originally established over thirty years ago by Mr. Joseph Kaye, the present senior partner in the firm, the founder from that time onward devoted his entire energies and ingenuity to the improvement of locks, in which he won almost immediate recognition by securing prize medal awards for his manufactures at numerous exhibitions. In due course his two sons,

Mr. J. Wainwright Kaye and Mr. Walter Kelita Kaye were admitted to the business. about eight years ago the business was converted into a private limited company when the present title was assumed, Mr. Joseph Kaye and Mr. W. K. Kaye becoming managing directors, the former although now over seventy years of age taking an active share in the direction of affairs, principally in connection with the London warehouse in Holborn, and in submitting his inventions to the different railway authorities. The last-named department is perhaps the most important of their manufactures, "K's" Patent Automatic Safety Wedge Railway Lock, with patent safety catch being now in use on most our largest railway systems, offering, as it undoubtedly does, an efficient solution of a problem long a source of anxiety to the companies in the risk to passengers arising from insecure locks. In combination with the patent safety catch this lock cannot be opened by accident by its inside handle, and as it will last as long as the carriage, the maximum of safety and durability is assured at a minimum cost. As indicating the extent to which this ingenious invention has been adopted, it may be stated that one English railway company alone has been supplied with upwards of 40,000 of these patent locks, which, it



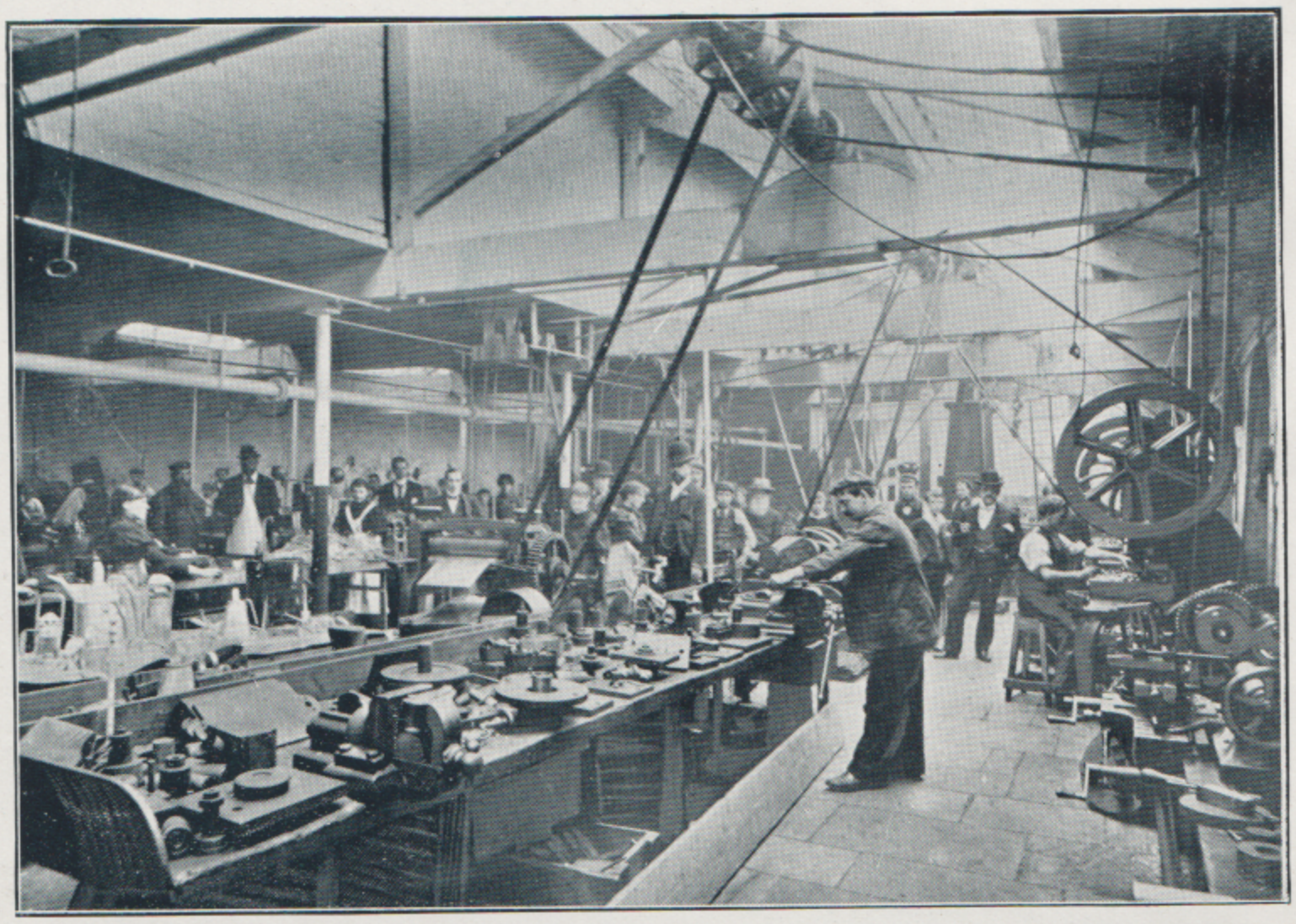
LOCK DEPARTMENT AS DISTINCT FROM RAILWAY LOCKS.

may also be added, are equally applicable for every kind of carriage door, its simplicity of construction constituting it the lock of the future for these purposes.

Messrs. Kaye & Sons, Ltd., have now in manufacture upwards of a dozen living patents for improvements in lock, and six or seven for oil feeders, another branch of their production, and have successfully prosecuted and defended five actions at law for infringements. Numerous highly influential testimonials commending the superiority of "K's" patent locks, latches, adjustable striking plates and handles, have been received by the firm from the London County Council, the Peabody Donation Fund and some of the leading architects, and they have also supplied thousands of locks for Banks, Police cell doors, Asylums, Workhouses, Infirmaries, etc., and all the new Board Schools in Leeds and district are fitted with locks of their patent. Other specialities of Messrs. Kaye's manufacture meriting mention are their patent

"Engaged" bolt for showing when rooms are engaged, such as bedrooms, offices, lavatories or any apartment requiring privacy, and in "K's" patent door porters we have another ingenious appliance, invented to meet the requirements of Mr. J. Vickers Edwards, County Surveyor of the West Riding of Yorkshire, for the Menston Asylum doors, and largely for doors in railway saloon carriages and other purposes. "K's" patent automatic bolts and locks, mortised into a pair of doors for entrance and panic exits, are recommended by the London County Council for places of entertainments, and of exceptional utility is their patent automatic unpickable padlock, offering absolute security as it can only be opened by its own key.

Not less noteworthy have been the numerous improvements effected by Messrs. Kaye and Sons in the construction of oil cans for machinery and locomotives, the first patent taken out by Mr. Joseph Kaye dating back over thirty years. Since that time constant modifications of the original design have been introduced covered by no fewer than twenty patents, and in the firm's



PATENT SEAMLESS OIL-CAN DEPARTMENT.

most improved form or seamless oil can, they have probably attained as near perfection in working and simplicity as is possible. The latest of these improvements is the new patent "Lancashire," oil can, seamless and practically indestructible, which has been invented for use more particularly in cotton mills, and which is rapidly superseding the old form of "bottle" oil cans for this purpose. The firm are also makers of an improved seamless torch lamp, constructed of plain and corrugated plates, circular lamps, bunker lamps, the steel seamless hand or hanging torch lamp and a strong corrugated oil bottle.

The works of Messrs. Kaye & Sons, Limited, occupy an area of 4270 square yards, facing South Accommodation Street, Hunslet, close to the new suspension bridge over the River Aire, and near to the Great Northern Railway new Goods Station. Passing through the well appointed offices, we are first introduced to the warehouse for finished goods where are kept thousands of various manufactures placed in systematic order ready for despatch at a moments

notice, the bulk going to the London headquarters in Holborn, which were rebuilt in substantial style some two years ago, and where the principal work of distribution is centred. Next to the stores is the large shop equipped with steam power presses for cutting and forming and deep drawing the oil cans and feeders, and a store for these goods and locks in an unfinished state.

Passing on, we next arrive at the works manager's office, and from here into the department where a large number of girls are employed in making the parts of railway carriage locks. Adjoining is the wood-turning shop where are turned, polished and finished the wooden handles for doors. The engine-room, next visited, contains a fine horizontal condensing engine providing motive power for the machinery, and this is fed by two large boilers working alternately. Then we arrive at the department for making domestic locks for all purposes already specified, and these are finished by male hands many of whom are highly skilled artizans in the handicraft. There are about two hundred workpeople employed in the various departments, separate entrances being provided for males and females, and in every point of equipment and organisation, Messrs. Kaye & Sons' establishment may be commended as a model of well ordered and efficient arrangement.

The firm's trade practically extends to all parts of the civilised world, they are contractors to H.M. War office, the Admiralty and the Indian State Railway, while their general connection may justly be said to include all the principle buyers of locks for every purpose, wherever these articles are in demand.

SAMUEL LAWSON & SONS,

Makers of Machinery for the Flax, Jute, Hemp and Tow Trades

HOPE FOUNDRY.

. . . MABGATE, LEEDS. . . .

THE HOPE FOUNDRY is one of the largest engineering establishments in Leeds, employing 1,600 hands and widely connected both at home and abroad in the great flax, hemp and jute using industries. Turning for a moment to the history of the business we may note that this is one of the oldest existing establishments of the kind in Leeds. It was founded in 1812 by Mr. Samuel Lawson and has descended from father to son to the present proprietors Messrs. Arthur Tredgold Lawson and Frederick William Lawson. For generations the firm have been engineers to the great textile trades mentioned above and for the rope, line and twine industries. Nearly all the plant and machinery they turn out is of special character, embodying points of design and detail elaborated during their long connection with their special manufactures, and it may be taken that they stand practically unrivalled in their own field and possess a thorough mastery of every detail of construction.

The works occupy an area of about eight acres, there is ample yard space in both ranges of buildings of which the interiors comprise immense glass-roofed workshops in addition to the massive ranges of exterior three-storey buildings.

As usual in large self-contained engineering establishments this is made up ot foundries, smithies, fitting, erecting and finishing shops, with several big steam-power installations, stores for materials, warehouse, offices, &c. The firm turn out a great deal of very special plant for the use of the spinners of Ulsters, Courtrai and other flax manufacturing centres, and also for the jute manufacturers of Dundee and for hemp workers everywhere. Preparatory and twisting machines for Rope and Twine Works is a kindred line in which they excel. A large portion of the power eqnipment of the Hope Foundry is of their own special design and make. At Exhibitions in London, Vienna, Philadelphia and elsewhere the firm have received awards.

The Proprietors are able business men as well as engineers, and keep in close touch with the industries with which their firm is so intimately associated.

. . MR. C. DAVIDSON, . .

STANLEY SHOE WORKS,

Telephone: No. 2170.

Compton Road, LEEDS.

THE modern tendency to sub-division in many of our principal industries is illustrated in the business of Mr. C. Davison, who confines his manufactures solely to that branch of the shoe trade technically explained as the "ankle strap and bar shoe pattern. In this line he has developed an extensive wholesale and export trade, and as shown in the busy activity prevailing at the Stanley Shoe Works on

the occasion of our representative's recent visit, the business may undoubtedly be classed with the most flourishing manufacturing concerns in the Leeds centre of the leather-working industry.

The Stanley Shoe Works established by the present proprietor in 1888 are situated in Compton Road, easily accessible from the City by the Beckett Street tram route which passes the end of the thoroughfare, and were erected on this site three years ago, to

accommodate the rapidly increasing business first commenced on smaller premises in Lovell Street. The factory is designed throughout on the ground floor plan, of light and lofty construction throughout, and combining every modern improvement in sanitation, ventilation and heating to ensure the most healthy conditions for the large number of operatives employed.

MR. C. DAVIDSON.

The general arrangements may be thus described. At the entrance are the well-appointed counting house and Mr. Davidson's private office, flanked on one side by the receiving department where materials are delivered, and the rooms for packing and despatching goods. To the rear is the large well lighted factory occupying an area of 600 square yards, arranged with numerous tables, and a number of sewing machines each attended by a female operative skilled in that particular branch of work, other portions of the premises are set apart for the clicking, rough cutting, rivetting and making-up and finishing departments, all of which are under the personal supervision of the principal, and are in charge of competent foremen in each branch.

The plant installed throughout the establishment is of the most up-to-date type for economising labour and minimising the cost of production, without it must be added, sacrificing in the smallest degree the efficiency of the workmanship or high quality of finish for which Mr. Davison's manufactures enjoy a well established reputation in the home and export markets.

The trade connection extends throughout England where the house is represented by travellers covering a wide circuit of the principal towns, and calling upon the leading factors with whom a large and steadily increasing business is transacted.

Telegrams—"UNION, LEEDS." Telephone—Works, 2543; Warehouse, 2542.

BENTLEY & TEMPEST,

CLOTH MANUFACTURERS,

Warehouse & Stock Room:
43 YORK PLACE,

Armley Mills, LEEDS.

FROM the earliest period of its recognition as the "chief seat of the woollen cloth manufacture in England," the old Armley Mills have ranked as one of the principal centres of the staple industry of the district, having been, according to local records, at work for at least two centuries, and at that remote period were in the ownership of the GOFF family, by whom the business was continued for some generations, about ten years ago the concern was taken over by the firm of BENTLEY & TEMPEST, the first named gentleman having been for twenty years manager for MR. JOHN WHITEHEAD, of Low Moor Mill, Holbeck. Since the death of the senior partner in 1894, the business has remained in the possession of MR. STEWARD TEMPEST, the surviving partner, now assisted by his four sons, all of whom have had a thoroughly technical training in the best school, and have thus gained a practical knowledge of every detail of the manufacture in which their firm is engaged.

The premises occupy an extensive area of ground situated on the hill-side, a position of which advantage is taken for the conveyance of all materials to the top of the mill, and is then treated by descending grades through the various processes of manufacture, emerging at the bottom of the building in a finished condition. Since taking over the factory, MESSRS. BENTLEY AND TEMPEST have completely re-equipped the whole of the departments formerly worked entirely by water power, and have installed a fine up-to-date plant driven by a powerful modern steam engine and a large boiler of the Lancashire type, 33 feet in length by 8 feet diameter.

In the basement portion of the premises are the scouring, pulling and finishing departments and the dye house, where all the cloths are dyed on the premises.

The first floor is the weaving room, and is fitted with sixty excellent modern looms containing 1,350 spindles, and the two storeys above are the scribbling and spinning departments, each furnished with a full complement of the requisite appliances for the respective operations carried out.

The carding and spinning floor is 66 yards long by 14 wide, and is conveniently divided off for each department, adjoining the rooms on the upper floors are spacious stores for mixing the various qualities of raw materials the initial process of the manufacture.

The leading articles of MESSRS. BENTLEY & TEMPEST'S productions are fine quality Unions, Meltons, Beavers, Serges and Vicunas, which are held in the highest estimation in the home and export markets to which they are supplied from the City Warehouse in York Place, and through the firm's representatives:—MR. THOMAS R. WHITE, Wilson Street, Glasgow, MR. W. S. SEELEY, 65 & 66, Basinghall Street, London, E.C., and MESSRS. ANDERSON BROTHERS, Manchester.

RICHARD BUCKTON & SON,

. . *Hunslet Linen Works,* . .

GOODMAN STREET, LEEDS.

AMONG the numerous divisions of the Yorkshire textile manufacturers now in active operation a considerable bulk of linen goods is produced by the above named old established firm, whose business gives steady employment to some three hundred hands, and in this branch is one of the largest in the Leeds district. Briefly recounted the history of the concern is as follows:—

First established in 1848 by the late Mr. Richard Buckton in East Street, the business was rapidly developed beyond the capacity of the premises at that address and was removed to the Atkinson Street Mills. In the course of time from similar causes operating the present extensive site was secured upon which was erected the large building which were first occupied in the year 1869. Three years previously the founder had been joined by his eldest son Richard, and on his death in 1890, the last named gentleman became the head of the firm, thus the firm remained until the year 1898, when the then sole proprietor died, and it has since been carried on by his two brothers Messrs. Harry Scott and Walter Buckton, and by Mr. Frederick Buckton a son, these gentlemen now constituting the personnel of the house.

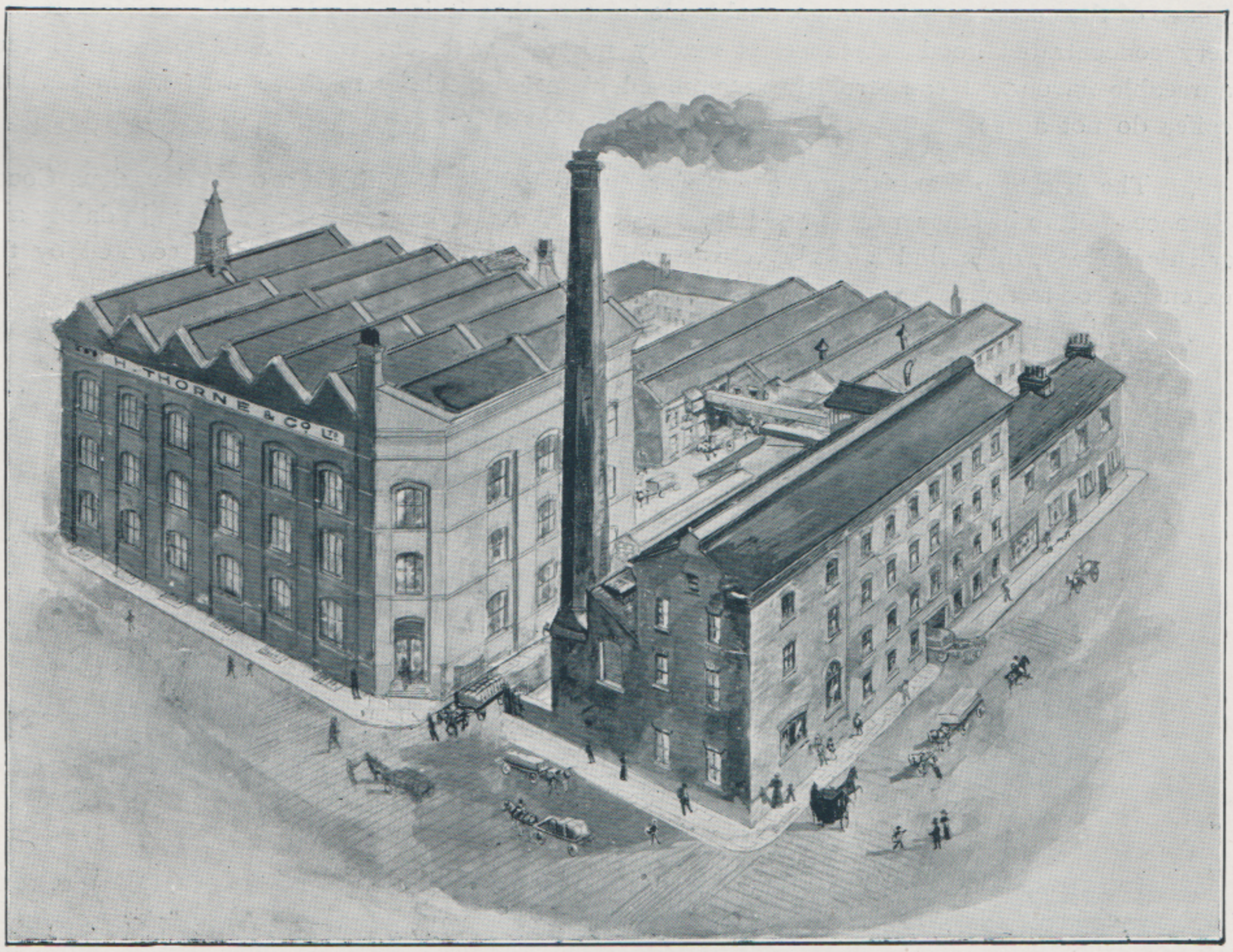
The principal articles manufactured at the Hunslet Linen Works are Flax, Hemp, and Jute goods, linen bed ticks, towelling cover canvas, and a wide range of materials incidental to and included in this trade. The firm are Government Contractors on the Army Clothing, Army Ordnance, and Admiralty lists, and also supply large quantities of cover canvas and other materials to the principal Railway Companies, in addition to an extensive connection in the home and exports market. The premises have a lengthy frontage to Goodman Street, with gateway entrance and timekeeper's office, admitting to a large yard and bleaching ground facing which is a substantial building containing the offices and warehouse, the latter having been considerably extended of recent years to provide accommodation for the immense stock of manufactured goods held for current requirements. To the left of this is the bleaching house, with engine house and boiler sheds adjoining, and stretching to a considerable distance in the rear are the weaving sheds and finishing departments erected on the ground floor plan and lighted from the roof. In this building is installed a plant of 300 looms of modern construction, motive force being provided by a fine horizontal engine of 90 indicated horse power erected in the house before mentioned. Although the firm have for some years ceased exhibiting it is worthy of record that on the last occasion of their doing so they were successful in gaining a gold medal at the Yorkshire Jubilee Exhibition at Saltaire in 1887. The telegraphic Address is "Ticks, Leeds," and the Telephone No. 733.

HENRY THORNE & CO., Ltd.,

COCOA, CHOCOLATE AND CHICORY MANUFACTURERS.

The Cocoa Works, Lady Lane, LEEDS.

THE unanimous commendation of the highest medical authorities and the leading journals of the profession has been gained by the "Health" Cocoa, Manufactured by Messrs. HENRY THORNE & COMPANY, LIMITED, which has been pronounced by the *British Medical Journal* as "Pure Cocoa of the best quality. It leaves nothing to be desired as to solubility, purity, strength and flavour." This testimony to the excellence of Messrs. Thorne's



speciality could be duplicated many times over from no less eminent sources did the space at disposal permit, the value of cocoa as a nutritive diet being now admitted as incontrovertible, as witnessed in the selection of Her Majesty's recent gracious gift to the forces engaged in the South African campaign.

The business of the firm is one of the oldest in this particular industry in the country, having been originally founded in 1832 by the late Henry Thorne, and converted into a private Limited Company in 1889. The Chairman of the directors is Mr. William Scott Barrett, J.P., Liverpool, and the manager, Mr. George Wilson. The "Cocoa Works," as the premises are styled, occupy a spacious area of ground in Lady Lane, Leeds, and comprise a substantial block of building of four storey's elevation, of which the ground floor is occupied as warehouse and suite of handsomely appointed general and private offices. The upper floors are used tor the manufacturing departments, and combine every modern appliance for the preparation for the celebrated "Health" Cocoa, Chocolate, Chicory, etc., and grinding and dressing ginger, which, with arrowroot, is largely imported by the firm. A complete plant of machinery has been installed for facilitating the various processes, motive force being provided by a steam engine and boiler erected in the ground floor portion of the establishment.

Messrs. Tnorne justly claim for their "Health" Cocoa absolute purity, and the properties of a matchless digestive, aud these qualifications are fully confirmed in the following extract from a report supplied by Sir Charles A. Cameron, M.D., Medical Officer of Health for Dublin, who states: "I have subjected to a careful analysis specimens of the "Health" Cocoa, prepared by Messrs. H. Thorne & Co., Limited, Leeds. The results of this analysis, and the experience which I have of the cocoa as a beverage, enable me to state that it is a most valuable article. It is a very concentrated good substance, is readily miscible with hot water and possesses a very agreeable flavour. I can strongly recommend its use, especially to those with whom tea and coffee do not agree.

The firm also manufactures a supericr quality of Homœpathic Cocoa and various Cocoa Essences put up in fancy packets and tins, and Chocolate in bars, cakes and drops in dainty and artistic boxes, which find a ready sale in all parts of the United Kingdom covered by the extensive connection.

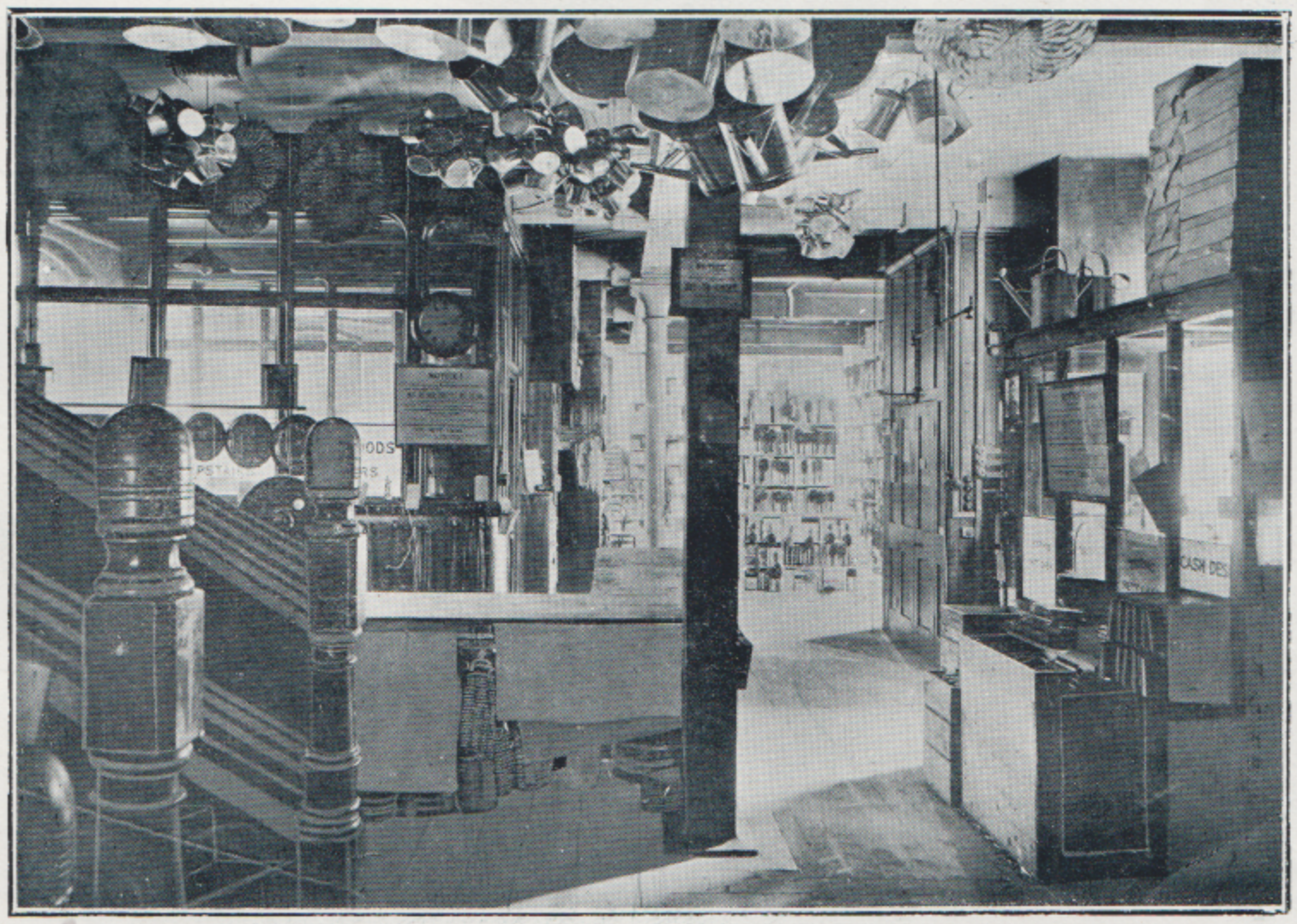
VASSALLI & CO.,

Wholesale and Retail Dealers in Hardware, Toys, Fancy Goods, &c.,

. . 11a, Wellington Street, . .

LEEDS.

IN addition to the very numerous and varied range of mercantile and industrial undertakings described in this work must yet be added as not least important, the old established business that for over half a century has been familiar to buyers in the North as "VASSALLI'S," one of the largest and most popular houses in the Wholesale Toy, Fancy Goods and Hardware trades out of London.



OFFICE AND IRONMONGERY DEPARTMENT (*Ground Floor*).

This remarkably successful concern was founded on a comparatively modest scale by the late MR PELLEGRINO VASSALLI, who commenced and carried on business as a Toy Dealer in Call Lane, Leeds, some 60 years ago, and afterwards in New Market Street, being at a later period succeeded by his-son-law, Mr. H. A. Routh, son of JOHN ROUTH, Accountant of Leeds.

From the first, rapid progress was made by the founder, and under the management of his successor the trade was so largely developed that it became necessary to provide very much increased accommodation for the constant expansion of the business. This was effected by the

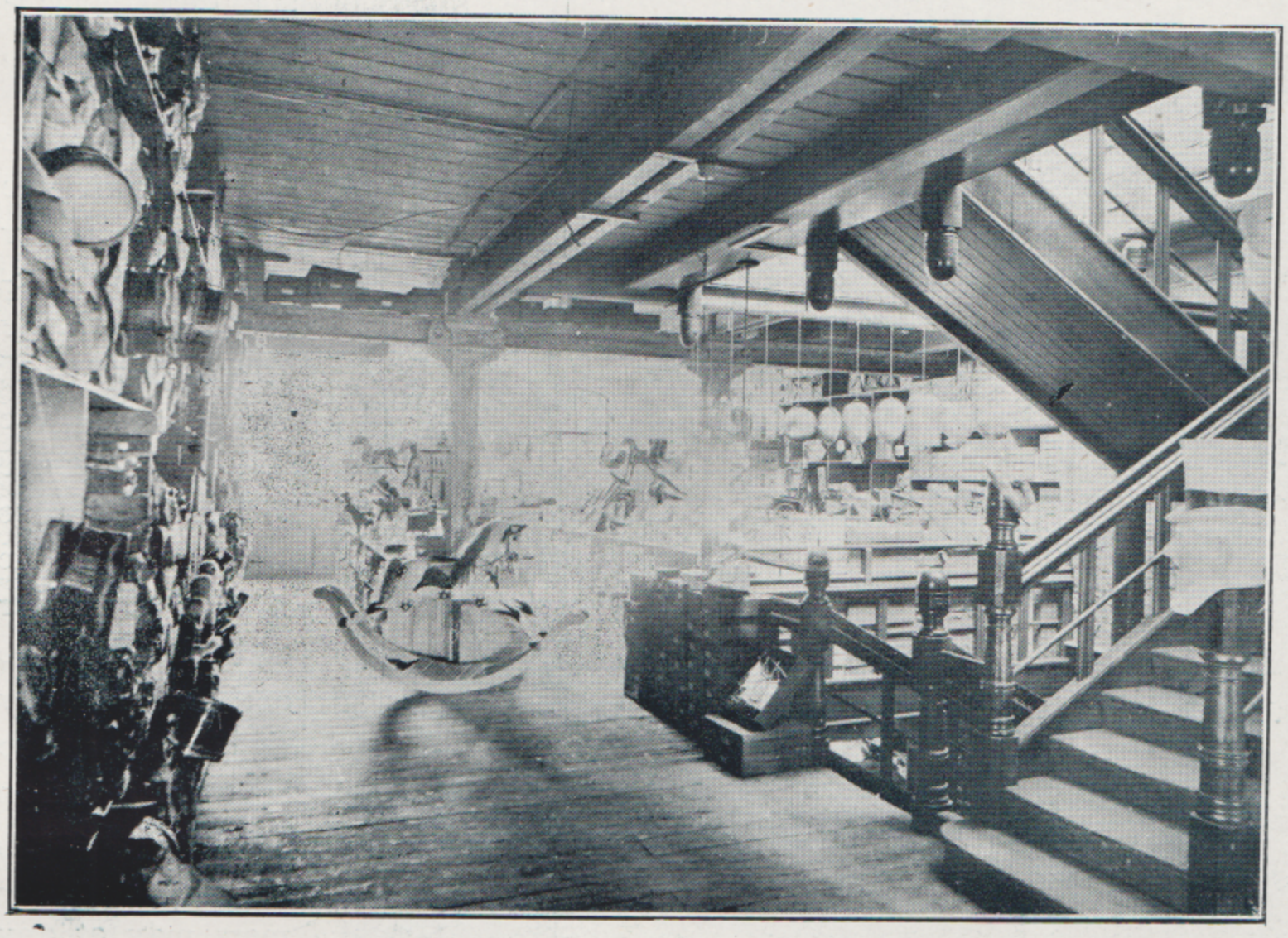
leasing of the immense block of premises in Wellington Street, one of the busiest of Leeds thoroughfares, and to this establishment the firm removed in 1898. Situated in the centre of the City, and within a few yards of the Leeds General Post Office and of the principal Railway Stations, the position of the Warehouse is exceptionally convenient for the conduct of the business, as will be more readily apparent in our subsequent explanation of the system of trading adopted by the firm.

FANCY GOODS DEPARTMENT (*First Floor*).

The Warehouse of four stories elevation has a lengthy window frontage on each floor, the whole of which is utilized for a striking display of Toys and Fancy Goods ranging from the cheapest to the most expensive. The premises extend in the rear to another entrance in Aire Street, and here the bulky cases and packages of Toys, &c. are received, of which the greater portion (about 85 per cent.) are of German manufacture. And here, we may state for the information of our patriotic readers, that this fact by no means infers an asperation on our national industries. The Continental

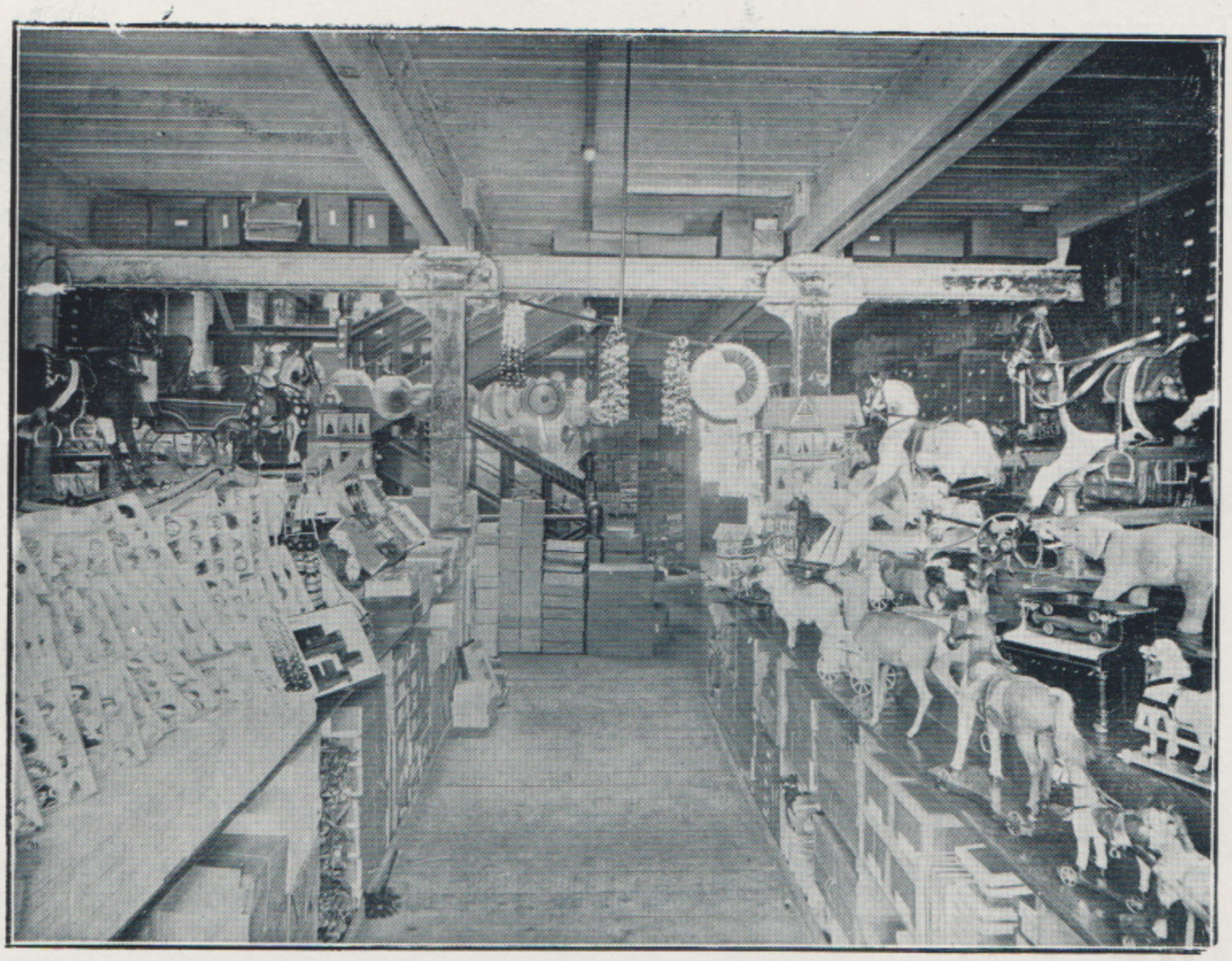
DOLL DEPATMENT (*First Floor*).

manufacturers possess exceptional advantages in economic production that renders it impossible for British enterprise — no matter how well organized—to compete with them in this particular field, and, as our informant stated:—"Send them a model of any article required, and in seven days they will undertake its reproduction in almost any quantity."



Toy Depaktment (*Second Floor*).

In this portion of the establishment also are the rooms where Goods are packed and despatched, and a part of the floor is also used for the storage of Hardware of which large stocks are held.



Toy Department (*Second Floor*).

Approached from the Wellington Street side by a flight of stone steps, the first floor is reached, and passing through the swinging doors we enter the commodious Show and Sale Rooms for Cutlery and Ironmongery Goods, in which are represented hundreds of useful articles in every day demand. And here also are the counters at which customers receive their goods, and this suggests a reference to the almost

unique methods upon which MESSRS. VASSALLI & CO. conduct their business. Notwithstanding the volume of their trade, they do not employ a single traveller, all the customers either attending in person, or ordering by correspondence, the boast of the firm being, "Once a customer, always one," and, as the trade is strictly for cash, the firm are enabled to supply as cheaply as the largest London Wholesale houses, and their customers may at any time rely upon it that Novelties are on hand as soon as put on the market. The second floor is apportioned to the Fancy Goods Department, plush and leather goods and games, and the whole of the two upper floors are devoted to toys of every description.

CHINA DEPARTMENT (*Third Floor*).

It would be obviously impossible in the space at our disposal, to enumerate in detail the many thousands of different articles kept in the vast and comprehensive stock and we therefore confine our description to the heads of the various departments, comprised in the Warehouse. These include Dolls of every description, both dressed

TOY AND CHINA DEPARTMENT (*Third Floor*).

and undressed, Wood Toys, Fur and Skin Toys, India Rubber Balls, Bats and Wickets, Mechanical and Hot Air and Steam Toys, Magic Lanterns and Slides in large variety, general Toys, Musical Toys, Children's Picture Books and Shuttlecocks, this last, a speciality of the firm.

In Fancy Goods, suitable for presents, &c , are shown Pictures, Ladies' Bags, Purses, Plush and Leather Companions, Work Boxes and Baskets, Scent Cases, Jewellery Cases, Dressing Cases and Desks, Inkstands, &c., and a numerous assortment of elegant nick-nacks together with porcelain and China Fancy Figures, Tea Pots, Vases, and articles of utility and for decoration in all the latest and most novel designs.

In other departments are stocked all kinds of Hardware, Tin and Enamelled Ware, Ironmongery, Cutlery, Brushes and small wares, covering, if not the proverbial "needle to an anchor," a somewhat similar extent of range in this class of goods indispensable in the household.

VASSALLI & CO. have established a wide-spread connection, extending throughout Yorkshire, Lancashire, Durham, and as far south as Nottingham, while their local trade alone is very large, the house being, in fact, the centre of distribution for this class of Goods throughout the busy and populous districts by which Leeds is surrounded on all sides.

The Leeds Slate & Marble Co., Ltd.,

. . SCULPTORS & MARBLE MASONS, . .

The Marble Works, Woodhouse Lane

. . . and Coburg Street, LEEDS.

MANY of the finest ecclesiastical edifices in the country, and notably Worcester and Edinburgh Cathedrals, have been additionally beautified by works executed by the Leeds Slate and Marble Company, Limited, which this year celebrates the jubilee of its foundation as an important Leeds industry, and is to-day one of the largest concerns of the kind in the kingdom. Originally founded in 1850 by one

WOOD HOUSE LANE EXTERIOR.

Dennis Lee, a well-known exponent of the stone-worker's handicraft, the business was continued under his direction for a quarter of a century, when he was joined by Mr. Anthony Welsh, and after the retirement of Mr. Lee was continued by the former as sole proprietor until his death in 1890. Subsequently the style was altered to that of

the Leeds Slate and Marble Company, and was converted into a limited concern four years ago under the direction of Mr. Robinson, the general manager.

Upon inspecting the show-rooms, we had an opportunity of examining some of the numerous examples of the Company's finished productions to which we may first refer. The principal show-room is devoted to specimens of exquisitely carved work in marble, Caen stone, alabaster onyx, etc., suitable for pulpits, baptismal fonts, reredoses, screens, etc., and also pavements and steps in marble and stone.

MARBLE PULPIT ERECTED IN HEBDEN BRIDGE.

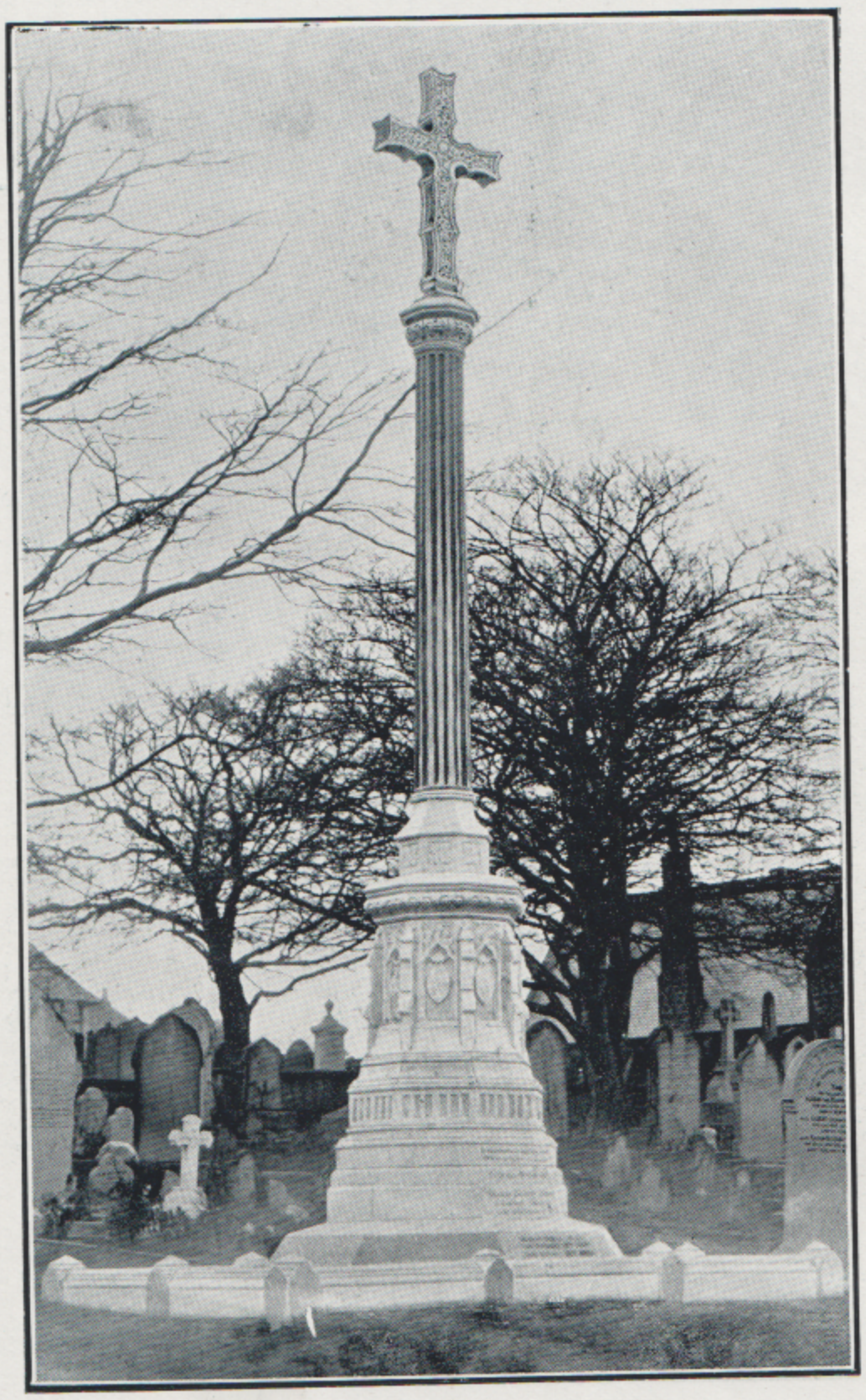
In the principal department were on view the largest stocks in the North of England of monuments, obelisks, crosses, head-stones, tombs, memorial tablets, etc., in granite, marble and stone; palisades of malleable, wrought and cast iron and bronze metal.

The Company undertakes restorations and general architectural work to their own or client's designs, for which drawings and estimates are submitted and orders and contracts completed with the best materials and in the highest class of workmanship at

exceedingly moderate charges. Inscriptions and lettering in imperishable materials are also executed by skilled workmen at very reasonable rates.

Designs for memorial brasses in extra thick metal artistically engraved are another leading feature, and in this branch original drawings are submitted in any style desired.

Among the more recent works executed by the Company are the marble steps for Durham Cathedral; Caen stone and marble pulpit and reredos, St. Mary's, Ting Road,



MARBLE MONUMENT IN CALVERLEY CHURCH YARD.

Leeds; marble font and Caen stone pulpit, St. Agnes, Burmantofts; marble font, steps and pavement, All Souls', Leeds; Restoration of the Saville Chapel (Lord Mexborough's), St. Oswold's, Methley; marble pavement and steps, Adel Church; marble pavement and steps, St. John's, Leeds; restoration ot the ancient monuments, Mexboro' Church; Caen stone pulpit and font, Cleckheaton Wesleyan Chapel; alabaster and marble pulpit, Old Town Hebden Bridge Baptist Chapel (of which we give an illustration); alabaster and marble work and restoration of Leeds Old Cross Parish Church; alabaster altar and rail and

carved marble pulpit, Catholic Church, Soho, London; with many other orders and contracts for the leading architects in the country.

The Company issue a finely illustrated catalogue of their principal specialities, and this we have pleasure in commending to the attention of our readers interested in the latest developments of monumental art, and the kindred industries carried out at the Woodhouse Lane Works.

MARBLE MONUMENT IN ADEL CHURCH YARD.

Messrs. FREDK. JACKSON & Co.,

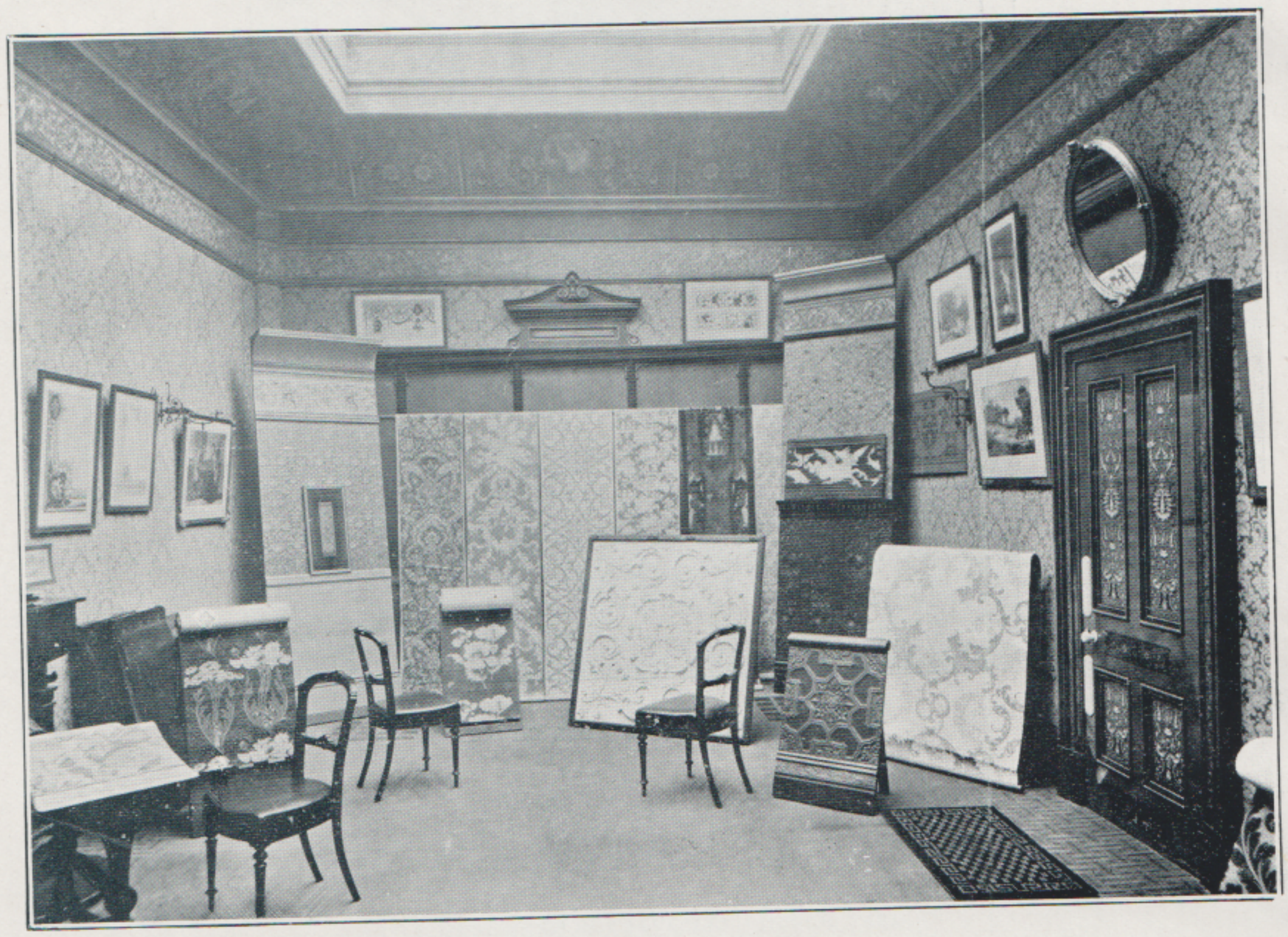
PAINTERS & DECORATORS,

Telephone No. 674.
Established 1796

. . . 17 Park Row, LEEDS.

EXTENDING back for three generations, the name of Messrs. Jackson & Co. has been closely associated with the progress of decorative art in Leeds, where the family has been settled for over a century, and has made a reputation of more than local significance in those branches of the trade in which they excel.

Originally established in Upperhead Row in the year 1796 by Mr. George Jackson, the grandfather of the present proprietor, the business was afterwards removed to Wellington



INNER SHOWROOM.

Street, where it was carried on for over 70 years, at the lapse of that time, the buildings being required for street improvements, the business was removed to Park Row, the Lombard Street of Leeds, where all the leading banks, also insurance offices and professional firms, are located.

Mr. George William Jackson, on the death of his father, Mr. Fredk. Jackson, became head of the firm, and in conjunction with Mr. Kidson Swales, whom he took into partnership,

carried on the business for a further period of over 27 years. On the death of Mr. Swales, on January 2nd, 1900, Mr. G. W. Jackson again became the sole proprietor of the business.

The firm has for many years been well known as proficient in high class and artistic decorative work as applied to exterior and internal embellishment of ecclesiastical and public buildings, mansions, hotels, &c., and other premises requiring superior and effective skill in treatment, and has, from time to time, been favoured with instructions to carry out the required work at the following amongst many other places:—The Leeds Town Hall, the Grand Theatre, Prudential Buildings, Queen's Hotel, Great Northern Hotel, Yorkshire College, Leeds Infirmary, Standard Insurance Buildings, Leeds School Board Offices, Leeds Branch Bank of England and Residences, Messrs. Beckett's Bank, Messrs. Wm. Williams Brown and Co.'s Bank, Royal Exchange Buildings, &c., &c. In addition, too numerous to be mentioned, could be named the mansions and residences of leading citizens of Leeds and of others situated in the County of York and elsewhere.

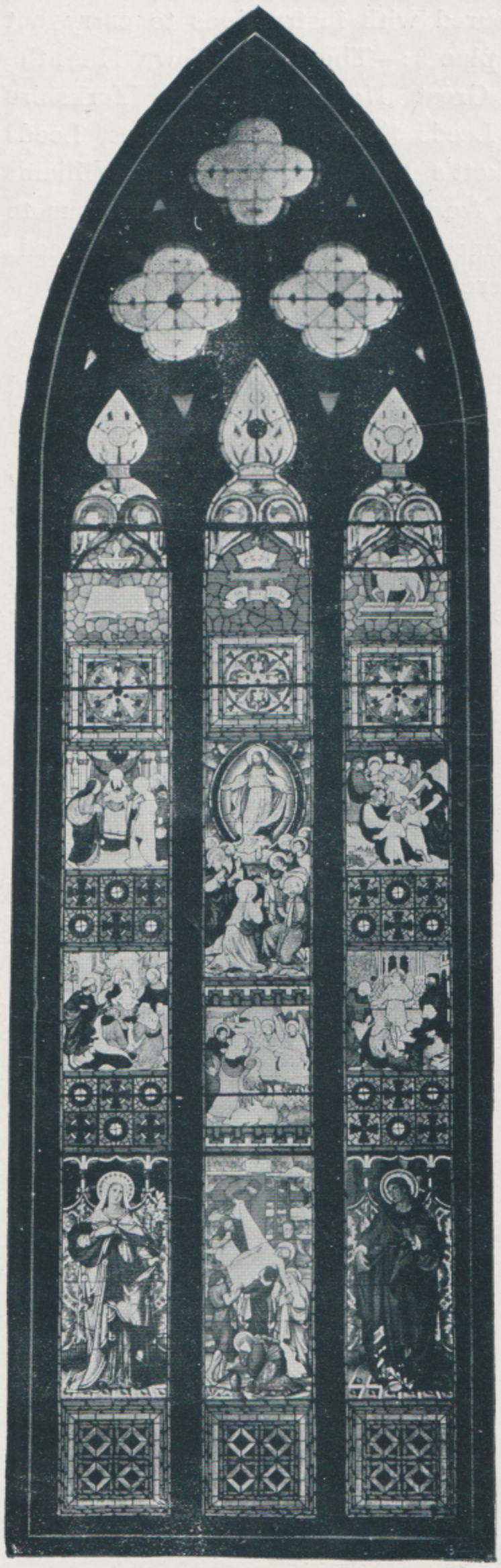
The building in Park Row, specially erected by the firm for its requirements, presents a handsome and substantial elevation of three floors and basement with stone frontage and very large window. The ground floor has spacious show-rooms, one being extremely well lighted with large lantern light, and containing a splendid assortment of wall-papers, friezes, dados, panellings, &c., together with numerous beautiful specimens of high-class painting, illuminated work, marbling, graining and gilding for interior fitments and details of decoration. A wide staircase leads to the floor above, on which are the general and private offices and stock-rooms for wall-papers of every description. In the rear are workshops equipped for the operative branches carried out on the premises, and we may bring this notice to a conclusion by saying that the whole of the premises are arranged up-to-date and adapted to the carrying out of an extensive and high-class decorative business.

. . GEORGE HALL, . .

PAINTER, PAPERHANGER AND CHURCH DECORATOR,

63, Woodhouse Lane, & 58, Cookridge St.,

Telephone No. 03172. **LEEDS.**



CHANCEL WINDOW IN A LEEDS CHURCH.

A striking and attractive feature of the main thoroughfare and electric car route from the City to the fashionable suburb of Headingley, the handsome establishment of Mr. George Hall in its ornate embellishment effectively indicates the artistic industry undertaken by that gentleman, who, for many years, has enjoyed a representative position in all branches of the house and church decorator's trade. During his lengthened connection with the business (over forty years), Mr. Hall has successfully fulfilled many of the largest and most important contracts in the North of England, his tenders having been accepted for the interior decorations of the Council Chamber of Leeds City Hall, also a considerable number of churches, chapels, and other public edifices and institutions, one of which is reproduced in our illustration. In 1889 Mr. Hall's abilities in design and execution of artistic decorative work were further recognised by an award of a gold medal at the Great Exhibition, York, for a handsomely finished door, with architrave and top, and other examples of the handicraft of which he is such a skilful exponent.

Turning to the present day aspect of the business and the special lines more closely identified with Mr. Hall's leading departments, we may first briefly outline the arrangement of the spacious premises, occupying the prominent corner site at the junction of Woodhouse Lane and Cookridge Street. The building is of four storeys elevation, with main entrance at the corner, giving admission to the offices, show-rooms and stores, above which is the principal show-room, where we had an opportunity of inspecting the large stock of high-class papers and other decorative materials and specialities which constitute the diversified stock. These comprise the very latest designs in wall-hangings, dados, friezes, medallions, panelling, mouldings, and Oriental and Continental manufactures suitable for

schemes of colouring and decorations for rooms, halls, staircases, and every form of interior work in this department. An exceptional range of novelties is also submitted in Lincrusta-Walton's and other new high relief decorations for ceilings and walls, namely, Tynecastle, "Cameoid," Cordelova, Asbestos (fire-proof), Anaglypta, Japanese, and imitation leather papers.

The establishment is the wholesale and retail depot for the "Glacier" Window Decoration, artistic, economical, and the only efficient substitute for stained or leaded glass, for which Mr. Hall has the wholesale and retail depot for the district. The material was first introduced in 1882, and has won its way to favour with all ranks of the public. It is now in use in thousands of private and public buildings, and has proved itself the exact thing needed for securing privacy without diminishing light. The apartments of Royalty have been decorated with "Glacier," and among other notable examples of its application are the buildings of the London County Council, the National Conservative Club, the Hotel Cecil, and His Majesty's Embassy at Berlin.

With regard to the work executed by Mr. George Hall in Leeds, two well-known Leeds churches have had the "Glacier" fitted in the chancel windows in appropriate church designs. The accompanying block will give some idea of the character of the finished design, but the black and white does not convey the marvellous richness of the effect. Mr. Hall has sent the designs and materials for church work into some of our Colonies, where they have been much admired. Specimens mounted on glass for all kinds of work, church, domestic and business, may be inspected in Mr. Hall's well-lighted show-room. Nearly 1000 patterns, forming innumerable combinations of "Glacier," are issued, and are all kept in stock, and orders are taken there for installation.

Estimates are submitted in all branches of the trade, the work being carefully carried out by skilled and thoroughly practical men, of whom a numerous staff is retained, and whose services are available for orders or contracts on any scale either in town or country.

PRESS EXTRACTS.

Taken from *The Plumber and Decorator and Journal of Gas and Sanitary Engineering*, London.

"OUR PROVINCIAL DECORATORS."

"It was all the fashion about fifty years ago to build chapels with four square walls, a Roman façade in stone, and a heavy elablature, such a one is Belgrave Chapel in Leeds, which has been very tastefully redecorated by Mr. George Hall, a local decorative artist of many years' standing. The portion of the sanctuary which affords the greater scope for decorative treatment in this order of architecture is usually the ceiling, and the structural character in this instance has been very suggestive of ornamentation, and has had very appropriate advantage taken of it. The centre of the ceiling is apportioned into eighteen panels sectioned by deep ribs, which are treated in tones of pale blue and amber, the flat being tinted a deeper shade of blue. The corners of each panel are ornamented with a patras design in shades of green and relieved with gold. Ventilators are fixed in the centres of each panel, and are tinted an amber tone with the ornamental portion in pale green. Each gasalier pendant, which is suspended from the centre ornament is tinted a pale green and fawn colour. The flat of the outer ceiling is also in fawn colour, followed by the cornice in blue and shades of terra cotta with the walls flatted in imitation of Caen Stone. The treatment of the gallery frontage is very appropriate and effective. Upon a maroon background is skilfully stencilled an elegant Grecian design in terra cotta, with mouldings in gold colour, followed by a soft shade of blue upon the coved ceiling of the gallery. The iron pillars which support the gallery are finished in a rich maroon, with the capitals in a cream colour picked out in gold. A broad border being a modification of the Greek key design, is

neatly stencilled in maroon, and serves as a dado rail for both gallery and basement. The vestry doors are treated in a remarkably elegant manner, being arranged in a number of small panels which are finished in a maroon, the stiles in terra cotta with the beadings in gold. The same treatment is followed upon the organ façade, the pipes of which are finished in a shade of blue and relieved with gold. Around the pulpit on a level with a polished mahogany Communion rail, is a deep coved recess which is ornamented with "egg and dart" design in maroon and terra cotta and relieved with gold, the same relief also being used for the mouldings. The pews have all been skilfully regrained in pale oak and varnished with a good hard "Church Oak," the desk rails, which are mahogany, being all French polished. Without noting further details of other portions of work I have pleasure in adding my word of commendation to the many others who have already expressed their warmest approval."

Extract from *Leeds Mercury*, March 28th, 1879.

"A striking improvement has been wrought by the decorator in the appearance of the Council Chamber which has undergone a thorough renovation. Before the work was begun the walls, and especially the damask panels, were covered with several inches of dust and some of the paintings hanging on the walls showed too evident signs of neglect. It was decided at first that the re-decoration should be carried out on the old lines, but as the work proceeded the suggestions of the contractor were adopted in favour of some departure from them. The most important feature in this alteration is that the panels have been painted in maroon, which sets out the general design in striking contrast. The sulight has been slightly lowered, so that the light is now thrown upon the whole of the ceiling, which was formerly very much in the shade. The "well" of the ceiling has been decorated in rich colours and gilded, and the general effect is exceedingly pretty. The ceiling proper is finished in rich drabs, with reds and greys and the mouldings gilded; portions of the latter being farther enriched with appropriate stencil-work. The cove of the ceiling is finished in a rich diaper pattern, in colours and gold. The design is an exceedingly pleasing one, and is full of painstaking and artistic work. The same may be said of the elaborate work on the cornice and frieze. The walls are very rich in colour. The panels, as has been stated, are finished in maroon, edged with gold stencil and lined; whilst the background has been painted a neutral sage green. The Corinthian pilasters are finished in light drab, and are richly gilded, whilst the capitals and bases, and the coat of arms, are in green and gold. The dado is grained in imitation of oak as before. The whole design is rich in colour, but the details blend harmoniously, and there is not the least approach to anything glaring. The painter, Mr. Hall, of Woodhouse Lane, is certainly to be congratulated on his work."

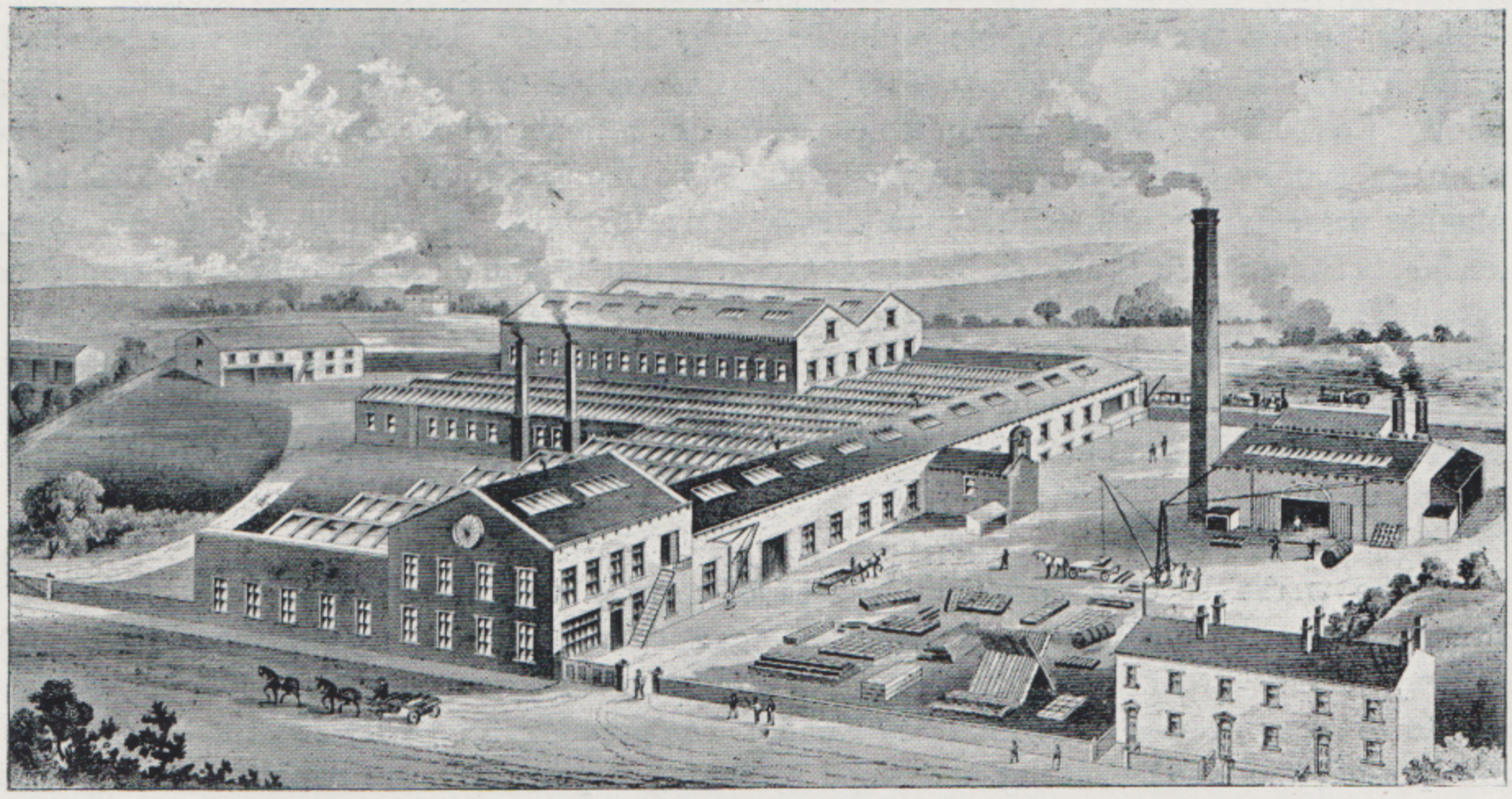
THOMAS HALEY & Co.,

. . *ENGINEERS,* . .

Sole Makers of the "Pioneer" Leather Working Machinery.

BRAMLEY, near LEEDS.

NOT the least remarkable of the vast developments of labour-saving methods within the last half of the closing century has been their application in the leather working trades, and in which a well-known Leeds firm, Messrs. Thomas Haley & Co may claim the distinction of having been the first to break new ground in the now familar field of engineering enterprise. A recent visit paid by our representative to the Railway Foundry, the extensive works of the firm at Bramley, enables us to place before the readers of the "Reviews" some interesting particulars relating to the rise and progress of the business, supplemented by a brief description of the principal specialities of the manufactures which have gained such wide-spread recognition in the home and export markets.



Originally founded in 1860 by Mr. Sam Haley, when a young man 21 years of age, the business was commenced on a modest scale in which the father, Mr. Thomas Haley soon afterwards joined, and the firm, assuming its present title, made rapid and continuous progress as founders and engineers. At a later date two other brothers, Messrs. John and Sugden Herbert Haley, on the completion of their indentures, were admitted partners, and since the death of Mr. Thomas Haley in 1875, have remained with Mr. Sam Haley, sole proprietors of the concern.

From the earliest period of its history, the partners devoted the closest study to the improvement of machinery and appliances of special design for the leather trade and its allied industries, and as suggested in the registered trade mark "Pioneer," became identified with the first types of this class of plant placed on the market. As an illustration of the substantial progress made by the firm as far back as twenty years ago it may be mentioned that at that time they supplied a complete plant for Messrs. Moses & Co.'s Tannery and Boot Factory at Armidale, New South Wales, which included engines, machinery and full equipment of appliances, costing with the building £4,000, and which gave the utmost satisfaction by its smooth and efficient working from the start. Perhaps no better example both of the firm's superior excellence of make and their public spirit in forwarding the objects of technical education can be furnished than in the splendid set of machines now at work in the leather industries department of the Yorkshire College, Leeds, comprising their Patent "Pioneer" Anglo-American Shaving Machine, Fluffing Machine, Patent "Climax" Staking Machine, Band-Knife Splitting Machine, Patent "Climax" Machine for Glazing, &c., "Pioneer" Injector Stuffing Drum, small sized "G" shape Rolling Machine, "Pioneer" quick Tanning Machine, and a Brushing Machine. The machines were selected by W. Beckworth, Esq., and Professor Proctor, and presented to the College by Messrs. Thomas Haley & Co., forming in fact a complete exposition of modern labour economising appliances in these trades of incalculable value to the students at the Institution. They have also made a valuable presentation of machinery to the Heralds Institute, Drummond Road, Bermondsey, London, S.E., of which Professor Parker is the principal in the Leather Industries Department. Messrs. Thos. Haley & Co. manufacture machines of the most improved type and design for the following and kindred trades:—Tanners, Curriers, Leather Dressers, Mill Strap Manufacturers, Picker Makers, Hydraulic Leather Makers, Glue Manufacturers, Fellmongers, &c. Space will not allow us to enumerate in detail all the machines shown in their most extensive and beautifully got up catalogue.

MR. SAM HALEY.

MR- THOMAS HALEY.

The works cover a considerable area of ground with a lengthy frontage to what was formerly known as the Leeds and Bradford Road, extending rearwards to the Great Northern Railway sidings (from which the firm have a private siding running into their premises), and close to Bramley Station in Stanningley Road. The premises are partly constructed on the shed principle but the wood working and wood seasoning departments are two to four stories high. The first floor is devoted to the general offices and store room, fitting up and erection of machines and accommodates the smiths, fitters, turners and machine hands. In this department there are seven overhead travelling cranes or hoists, all of which communicate with the east and west doors to which the private siding runs. At each of the doors is fixed a large crane for loading and unloading goods direct into or out of the Railway Co.'s trucks or into the yard. The basement is used for knife manufacturing, grinding and glazing departments also as a store for all kinds of Engineering materials. The second floor comprises drawing office, model making and

machine joinery, stores for models, also timber seasoning stores. The third floors of the whole premises are entirely occupied as model stores. The power for the engineers' workshop is provided by a 20 H.P. engine by the firm with all the latest cut off movements and large Cornish boiler. The firm make all their own castings both iron and brass, the foundry being erected as a separate building and having two cupolas and three brass furnaces, a separate engine and a powerful Root's blower supplying the blast to the cupolas. Two powerful cranes are provided for lifting up to ten tons.

The establishment is completely organised and supplied with the most modern plant and machine tools for facilitating the output of the various machines to which reference has been made, the works giving regular employment to nearly one hundred skilled hands in the different departments. A very handsome fully illustrated catalogue issued by Messrs. Thomas Haley and Co., gives ample details of their numerous patents and specialities of manufacture and to this we refer readers desirous of ascertaining the latest and most up-to-date information on the various subjects briefly alluded to in our notice. The firm's trade connection is of world-wide extent and is served by agents specially appointed in France, Italy and Buenos Ayres, while their circle of home customers comprises the leading houses using this class of machinery throughout the United Kingdom.

The premises in the Calls, constituting the firm's headquarters, comprise a suite of offices situate in a building to themselves and separate from the other departments, with a private room for the principal. In the rear is a yard extending back to the river where a wharf frontage is utilised for loading and unloading materials, etc., direct on the ground. There are also extensive premises on Warehouse Hill affording commodious accommodation for reserve stocks, with well arranged stores for cement and other goods of a more or less perishable character, also covered sheds for the storage of laths. For view of these premises, as seen from Leeds Bridge, see preceding page.

MR. H. G. ATKINSON.

Mr. Atkinson imports into Hull and Garston large quantities of Swedish plastering laths, both riven and sawn, and stocks are held at both these ports in addition to those at Leeds and Sheffield.

He also employs several lathrivers for the making of homesplit laths, lath and half, and double laths of special quality.

He does an extensive business in roofing slates direct from the quarries at Bangor, Carnarvon and Festiniog, and holds stocks of these at Mold Junction available for orders where quick delivery is essential.

The importation of Canadian pine doors is a special feature of the business; these are brought direct into Liverpool and Manchester and distributed from these ports. Mr. Atkinson manufactures joinery of every description. Doors and windows are made to any size and specification. Skirtings, architraves, handrails, sash stuff and mouldings of every sort, made to any design and of any kind of wood. Special book of designs sent post free on application.

One of the most important articles dealt with is Portland Cement. Mr. Atkinson is sole agent for Yorkshire and district for Messrs. John Bazley White & Bros., Portland Cement Manufacturers, London, and stocks their manufacture both in Leeds and Sheffield. Other brands of Portland Cement are also dealt in, any of which he is able to deliver to any railway station in England and Wales. A widespread connection among builders and contractors is served throughout the Northern Counties, both from the chief establishment here and the branch store at Sheaf Street, Sheffield.

Mr. Atkinson supplies Keene's, Parian, Roman and mastic cements, lias lime, both ground and lump, plaster of Paris, plasterers' hair, roofing slates, floor, ridge and roofing tiles, copper, zinc and galvanised slate nails, slate laths, plastering laths, fibrous plaster centre-flowers and enrichments, doors of various sizes and thicknesses, most of which are regularly kept in stock at Leeds and Sheffield. The requirements of the trade are so varied that enquiries are solicited for every description of builders' goods.

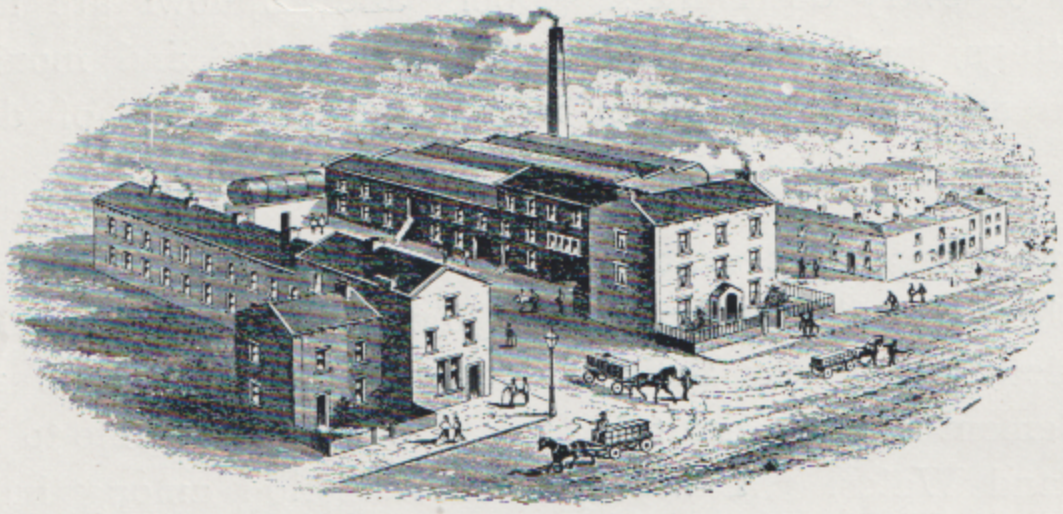
Messrs. W. C. SIMPSON & Co.

. . . HIGH-CLASS . . .

AERATED WATER MANUFACTURERS AND HOP-ALE BREWERS,

Brunswick Works, Pudsey, near LEEDS.

THERE are few more familiar forms of advertisement in this portion of the West Riding than those issued by Messrs. W. C. Simpson & Co., and which in numerous and varied effective devices are to be found in all the surrounding towns and villages within a radius of some miles from the firms headquarters. The methods adopted for popularising the high-class aerated waters manufactured at Brunswick Works indicate the enterprising lines upon which the business is organised, handsome show cards of artistic design, calendar clocks in pretty frames, bells for bar tables and counters, brass and copper ash trays and waiters being freely distributed to Messrs. Simpson's customers, principally innkeepers resident in Pudsey, Leeds, Bradford, Morley, Guisley, Horsforth, Headingley, Stanningley, Armley, Wortley and the intermediate places covered by the firm's extensive trade connection.



The business was established some six years ago by Mr. William Christopher Simpson, who was previously a partner in the firm of Thornton & Simpson of Greenside, Pudsey, and who on the dissolution of that partnership commenced operations on his own account at Lidgett Hill. Within the following five years the accommodation at that address became quite insufficient for the continuously increasing trade, and Messrs. Simpson accordingly purchased the freehold of the extensive property in Robin Lane which included the factory and several cottages. At considerable outlay the premises were partly re-constructed, four of the cottages now forming the stables, coach-house and harness room, the buildings enclosing a large open yard. On the right of this space are the offices and works, the latter being of two storeys elevation, the ground floor occupied by a splendid modern plant, one of the bottling machines alone having an output capacity of from 80 to 100 dozens an hour. Their are also steam bottle washing machines and the latest type of ærated water plant for screw

and ordinary corking syphon filling, &c., motive force being furnished by a powerful "National" gas engine. Reached by a few steps from the machine room is the laboratory in which the various fruit syrups and flavouring essences are compounded from the best and purest qualities of ingredients and are stored in a number of large china pans communicating by tin lined piping with the various filling machines, the quantity being regulated by a service of taps. In another portion of the premises is a complete equipment of appliances for brewing stone ginger beer and hop ale a great speciality of the firm's manufacture.

Throughout the various departments the utmost order and cleanliness are observable in every detail of the arrangements, and mark the care and attention given by the proprietor in these all important particulars. A similar note of commendation must also be pronounced in reference to the admirable condition in which the excellent stud of horses is kept, and the well-appointed vehicles used in the collection of orders and delivery of goods, which do credit to the firm and the attendants engaged in the work. With the facilities for production thus briefly outlined it is easy to understand the wide-spread favouritism of Messrs. Simpson & Co.'s beverages which include high-class lemonade, soda water, lithia, seltzer and potash waters in syphons, horehound, hop ale, ginger beer, cider, dandelion stout, special ginger ale, sarsaparilla, lime juice, stone ginger beer, grape champagne, orange ale, soda and lemonade in bottles, and cordials in the form of raspberry, peppermint, gingerette and black beer.

The firm do not employ travellers believing that the quality of their productions will in the future as in the past suffice to sell all they can produce; and in conclusion it only remains to congratulate the firm on the success which has attended their energy and enterprise aided certainly by a consistent policy of supplying an article of irreproachable purity and wholesome quality which deservedly commands the confidence of an ever widening circle of consumers among all classes of the local public.

THOMAS STORY & Co.,

REGISTERED PLUMBERS AND SANITARY ENGINEERS,

. . 50, Cookridge Street, . .

LEEDS.

THIS firm was established in 1785, by the great grand-father (Wm. Story) of two of the present firm, who died in 1793, his son (John Story) succeeded to the business and died in 1838, when the business was managed by his son Thomas Story (who was then 17 years of age), he was made partner at the age of 21 and continued to take an active part in the business till 1897 (from 1851 as sole partner) when he retired in favour of his son (T. Hatfield Story), his nephew (John Story) and Wm. Keogh.

RESEARCH LABORATORY, DYEING DEPT., YORKSHIRE COLLEGE, LEEDS.

Some of the leading educational institutions in the country and the majority of the departments of the Yorkshire College have obtained their laboratory and technical instruction

equipment (so far as their department of work is concerned) from the firm, whose connection with the plumbing and kindred trades, entitles them to certainly rank oldest representatives of this industry in Leeds, if not in the United Kingdom.

The firm's establishment, centrally situated in Cookridge Street on the main tramway route from the city to the suburb of Headingley, comprises a spacious and conveniently arranged warehouse, stocked with all kinds of sanitary appliances, water, gas and steam fittings, requisites and materials of every description incidental to all branches of general

GENERAL LABORATORY, LEATHER DEPT., YORKSHIRE COLLEGE, LEEDS.

plumbing, sanitary engineering and house drainage work. In the rear are the well equipped workshops occupied by the operative departments in which the firm employ the services of a numerous staff of thoroughly experienced and competent hands permanently engaged in the execution of town and country orders. As already suggested the most important speciality of Messrs. Story's business is the fitting up of laboratories and schools of science, among the contracts fulfilled in this branch having been plumbing work in the various Technical departments of the Yorkshire College and the Central Higher Grade School, Leeds; University Tutorial College, London; Royal Polytechnical Institute, Battersea; the Northampton Institute, Clerkenwell; and Colleges; Higher Grade Schools and other Institutes, as far South as Bournemouth and as far North as Glasgow.

The Members of the firm are registered by the Worshipful Company of Plumbers, London, and are thus fully qualified as experts in sanitary and house drainage engineering, in which they undertake inspections and prepare reports and estimates for improvements in ventilation and construction in accordance with the latest scientific principles embodied in the regulations of local health authorities.

SCIENCE CENTRES FITTED BY THOS. STORY & Co

University Tutorial College, London.
Royal Polytechnical Institute, Battersea, London.
Northampton Institute, Clerkenwell ,,
Uddington Old School, Glasgow.
Notre Dame Training College, Glasgow.
Yorkshire College, Dyeing Department, Leeds.
,, Engineering ,, ,,
,, Textile ,, ,,
,, Leather ,, ,,
,, Physical and Electrical Department, Leeds.
,, Biological Department, Leeds.
,, Optical ,, ,,
,, Chemical ,, ,,
,, Agricultural ,, ,,
,, Geological ,, ,,
Grammar School, Leeds.
Central Higher Grade School, Leeds.
Higher Grade School, Bewerley Street, Leeds.
,, ,, Armley, Leeds.
Board School, Hunslet Lane ,,
Middle Class School, Leeds.
Modern School, Leeds.
Ladies Council of Education, Leeds.
Grammar School, Pocklington.
,, Rastrick.
,, Richmond.
,, Retford.
,, Ilkley.
,, Campbeltown.
,, Bridlington.
St. Bedes Grammar School, Bradford.
Grammar School, Chesterfield.
Girls High School, Kingston-on-Thames.
East and West Riding Agricultural College, Garforth.
Grammar School, Knaresborough.
Grammar School, Dorchester.

Technical School, Ossett.
,, Accrington.
,, Southend-on-Sea.
,, Hyde, Manchester.
,, Wigton.
,, Harrogate.
,, Macclesfield.
,, Leek.
,, Glossop.
,, Bournemouth.
Higher Grade School, Brunswick Avenue, Hull.
,, ,, Douglas, I.O.M.
,, ,, Wolverhampton.
,, ,, Portsmouth.
,, ,, Brighton.
,, ,, Grimsby.
,, ,, Belle Vue, Bradford.
,, ,, Abbey Road, Derby.
,, ,, Victoria Road, Southsea.
,, ,, Workington.
,, ,, Huckmondwike.
,, ,, Scarborough.
King Edward's Grammar School, Pontefract.
Derby School, Derby.
Craven Street Board School, Hull.
The College, Harrogate.
County School, Llangollen.
Royal Institution, Hull.
Municipal Technical School, Brighton.
The Academy, Ardrossan.
Diocesan Training College, York.
Rowntree & Co., Cocoa Works, York
Coal Clough Board School, Burnley.
School, Dalbeattie.
Pupil Teachers' College, Leeds.
W. L. Jackson & Sons, Ltd., Tanners, Lee

ACKROYD & BROS., Ltd.,

Colliery Proprietors and Manufacturers of Sanitary Tubes, Fire Bricks, . . Art and Domestic Pottery, . .

Morley Main Collieries,

. . . MORLEY, YORKS.

Chairman and Managing Director - MR. WM. ACKROYD.

AN extensive and important development of one of the largest colliery businesses in the Yorkshire coal field has recently been effected by the ancient firm of Messrs. Ackroyd & Bros. Limited, whose connection with the great national industry dates back twenty years before the dawn of the Nineteenth Century (George III.), at that time, Mr. Francis Ackroyd, the great grandfather of the present Chairman and Managing Director of the Company commenced the working of some coal mines at Horton near Bradford, and in course of time, his son, Mr. Thomas Ackroyd removed to Birkenshaw where he established a similar business, besides purchasing and working a large factory, in the worsted manufacturing trade, and having two collieries at that place in operation. The last-named gentleman's two sons Messrs. Wm. and Thos. Ackroyd afterwards added the Oakwell Colliery at Driglington, they also carried on the trade of Worsted Stuff Manufacturers and English Timber Merchants at Birkenshaw.

In 1851 or 52 the firm leased from Lord Dartmouth the coal seam at Morley and sunk shafts to develop them, about 45 years ago they exhausted the Birkenshaw Collieries and subsequently the pits at Driglington and Birstall. In 1897 the important discovery was made to which we have alluded in our opening sentence, this taking the form of opening up strata of particular kinds of clay of which one was found adapted for high class art pottery, and the other for the manufacture of sanitary tubes, fire bricks, &c., the seams running concurrent with the coal, and furnishing an apparently inexhaustable supply of very valuable materials. This is especially the case as applied to the manufacture of sanitary pipes, which when tested by slow pressure were found to resist in the case of the 4-inch pipe a strain of 245 lbs., and in that of the 6-inch 250 lbs. to the square inch, the thickness of the pipe being 1/10th of its diameter, works have since been erected as potteries and pipe manufactures to which we shall have occasion to refer at a later stage of our article.

Thanks to the courtesy of Mr. Alfred Ackroyd, one of the Directors, who acted as guide to our representative on the occasion of a recent visit to the works, we are enabled to give the following brief outline of their organisation and equipment. The premises occupy an enormous area, as may be estimated from the fact that the "tips,"

or spoil heaps, shafts, works, etc., cover over ten acres of ground, with trollies worked by endless ropes constantly running to and fro. The whole of the immense space is intersected in all directions by lines connected by two steep inclines with the Morley Station of the London and North Western Railway. The waggons being shunted by means of powerful capstans. There are altogether forty engines and steam pumps employed in various parts of the works; the engines are supplied by ten huge boilers. It may also be mentioned that the Low Moor black bed, from which the ironstone used in the manufacture of the world-famous Yorkshire iron is produced, extends to and runs through the estate, but is as yet undeveloped; also the well known "Better Bed" fireclay, which has been proved of excellent quality and thickness.

WM. ACKROYD, ESQ., J.P., F.I.I.. Chairman.

The Morley Main Collieries have three winding shafts, one known as the Deep Pit, and another as the Beeston, and the third as the Cannel Shaft; also an upcast shaft and an extra downcast shaft situated about a mile distant from the winding shafts, which are connected by endless haulage, and altogether there are about fourteen or fifteen miles of rope in use in the workings.

Our starting point was the offices, contained in a separate building of two floors, the ground level being occupied as general and cashiers offices and showroom for specimens of art and domestic pottery, above which are the private rooms of the principals. Proceeding through a large yard stacked with huge piles of timber for pit props, we passed the store room and underground manager's office, and entered the lamp room, where the safety lamps are taken to pieces and carefully cleaned by an Ackroyd and Best patent lamp cleaning apparatus. Mr. Wm. Ackroyd is also the Chairman of this Company—patentees of the particular form of lamp used in the colliery, and acknowledged by experts to be the safest and most complete in the market. They are fitted with a patented device for detecting the absence of gauzes, an automatic lock, electric oil-igniting contacts, replenishing with oil mechanically, and can only be unlocked electrically by the lamp man to whom they are delivered. Another advantage of this lamp is that it is impossible for it to be given out incomplete, as every part must be present or the defect is instantly revealed. If the lamp is in perfect order it can be lighted by an electric apparatus (another invention of Messrs. Ackroyd & Best, Limited,) used for the purposes of ignition in the lamp room *only*, as the miners call for them on their way to the pits.

Leaving this interesting department, we passed through the smithy with its row of forges, where all repairs to plant are executed, into the house where the air-compressing machinery for working the coal-cutting machines is installed, which is driven by a pair of powerful engines. In an adjacent building is another engine, and a duplicate engine at rest, but always ready in case of a breakdown, working a Leeds fan for ventilating the mines; close by is a saddler's shop, where the horse gear and pump buckets are made and repaired. In another building are placed the two fine engines for winding the Deep Pit Shaft, one for winding by friction and the other for

ordinary gear and pumping.

ALFRED ACKROYD, ESQ.

Next we enter the repairing shop for the large number of railway waggons owned by the firm, this department being equipped with a complete plant of wood-working machines of the most improved type. To this also is attached a turning shop for the engineering and fitting work. A short distance further on is the engine house for winding the Beeston Shaft, worked by another pair of engines. At the Great Northern Pit there is a large air-compressing engine working two of Gillott's Coal-Cutters.

The next department visited was the pottery works which have been fitted with an entirely new plant by Boulton of Burslem, in the moulding, drying and dipping rooms, to which are attached stores, a special press, blunger, pugmill, pumps, straining tanks, presses and a range of kilns, passing an extensive block of stabling we come to the sanitary pipe and firebrick works, to which three large circular kilns have recently been added, we had an opportunity of inspecting the arrangements of this new department of the firms business which may be pronounced in every respect as equally up-to-date with the plant and equipment laid down in the pottery. Here are made what are termed in the trade as vitrified pipes, a much stronger class of goods than the ordinary make. The *modus operandi* of the manufacture presents hardly any material difference to that usually employed in this branch of work and will therefore need no special description of its various processes.

Yet another extensive development of Messrs. Ackroyds' business is now in progress, the firm being engaged in erecting a large brick-making plant for the manufacture of fire and red bricks, to which will ultimately be added the production of white and coloured glazed bricks.

In 1893 the business was converted into a Limited Company, of which Mr. William Ackroyd, the present Chairman and Managing Director represents the fourth generation of the founder's family in direct succession as head of this flourishing industrial undertaking

Messrs. ACKROYD & BEST, Ltd.

Inventors, Patentees and Sole Makers of . .

. . "BEST" MINERS' SAFETY LAMP,

OFFICE AND WORKS—

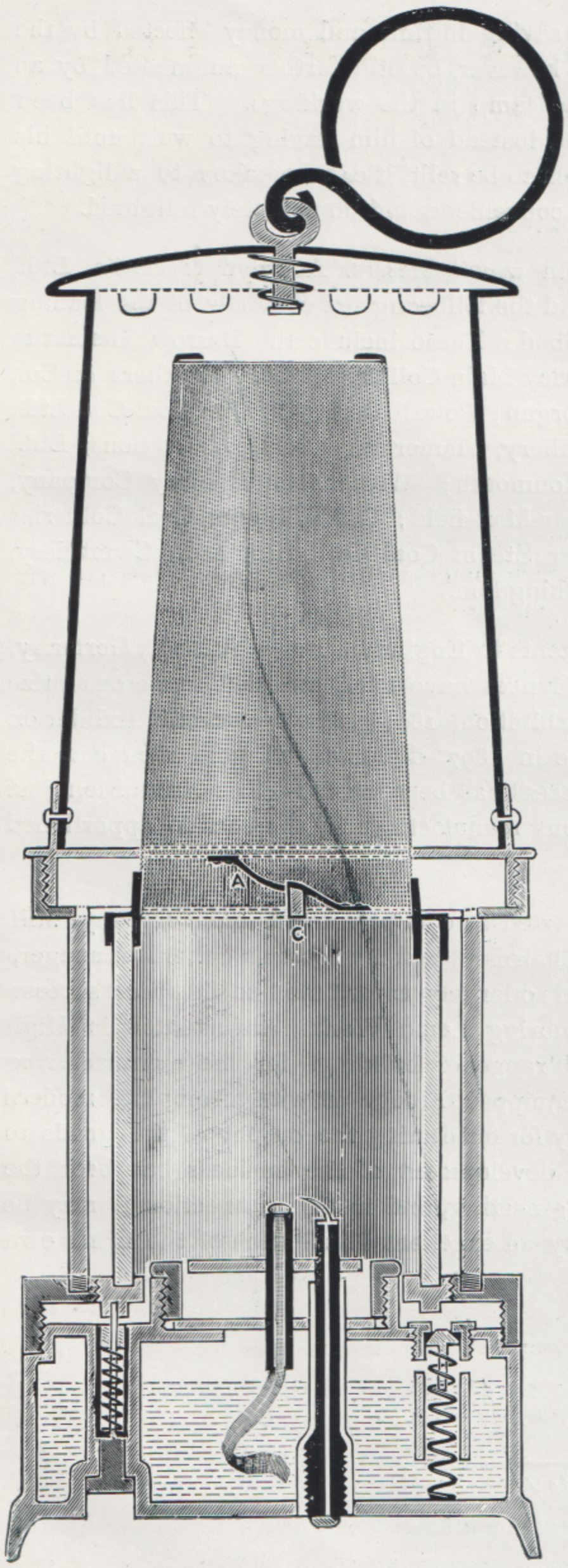
High Street, MORLEY, YORKSHIRE.

Telegraphic Address: "LAMPS, MORLEY." *Telephone: No. 86.*

MODERN science claims few more distinctive triumphs in this age of wonderful discoveries than those applied to ensuring the safety of the miner, perhaps the most dangerous of all avocations in which members of our great industrial army are employed. From the time of Sir Humphrey Davy the highest efforts of human ingenuity have been devoted to the invention of a "perfect" safety lamp, which while affording a sufficient light for the work required in the depths of mother earth, should yet provide absolute immunity from purely preventible accidents arising from defective mechanism or faulty construction of the apparatus. These qualifications are completely fulfilled in the "Best" Safety Lamp, invented, patented and manufactured only by Messrs. Ackroyd & Best, Ltd., unquestionably without rival in efficiency as convincingly evidenced by its adoption in the largest collieries at home and abroad.

A brief *resume* of the history of the invention may appropriately serve as preface to a fuller description of the points of improvement embodied in the lamp and auxiliary appliances manufactured by the firm. For some years employed in the responsible position of lamp foreman at the collieries of Messrs. Ackroyd & Bros., Ltd., known as the Morley Main, Mr. Best had many opportunities of inventing these indispensable requisites of the miner's occupation, and with a full practical knowledge of the requirements essential to its effective working, produced, with the financial assistance of Mr. Wm. Ackroyd, a safety lamp, not only proof against any ordinary accident, but obviating the possibility of tampering on the part of the workmen themselves, while being readily lighted, opened and manipulated for all legitimate purposes. The novel features of the lamp to which attention may be directed are—first, a new patented device for detecting the absence of gauzes, and next, a patent screw-off bonnet which is automatically locked and unlocked, for which a patent has been granted in Germany, being a certain indication of novelty. These improvements are so designed as to work in perfect harmony one with the other. In the event of omission to replace the gauze when fitting the lamp parts after being cleaned, a new patented device has been invented in order to easily detect the absence of the gauzes. In the first instance the lamp vessel cannot be locked, and in the second the lamp bonnet cannot be made secure. Every part must be present, otherwise the defect is instantly revealed. Other improvements identified with this invention and introduced and patented by Mr. Best on behalf of Messrs. Ackroyd & Best, Ltd., are a patent electrical apparatus for lighting the lamps, either in the lamp room or at underground stations; an impregnable electric safety lock, which is automatic in action; a patent oil-replenishing

apparatus; a patent electro-magnetic unlocking apparatus for use in the lamp room; a spring top for the lamps, to obviate any risk of the light being put out by vibration or concussion; a gauze ring fitted with duplicate flanges for the purpose of securing the flexible jointing ring in position.



Although it may be premature to suggest that Messrs. Ackroyd & Best, Ltd., have by any means reached finality in this field of mechanical invention, as they are now placing on the market another important improvement which has just been patented in Germany, this improvement will increase the illuminating power of the light to the extent of 100 °/₀ more than the ordinary safety lamps, and we may be permitted to suggest that their "Climax" miners' safety lamp cleaning machine has at all events concluded at present a remarkable sequence of improvements, effecting a saving in time and labour best indicated in the fact that by its means one hundred complete lamps can be cleaned by two hands (a man and a boy) in one hour. The substantial advantages of these appliances may be concisely summarised as follows: When the miner has finished work and given his lamp in at the cleaning room window, the lamp-man takes the lamp and unlocks it with one of the firm's patent magnetic unlocking appliances, and then cleans it with the patent "Climax" machine. However dirty the lamp may be, it can be cleaned in half the time of the ordinary method of cleaning by hand, at the same time a boy may replenish the vessel with oil by the firm's oil re-filling appliance, then the vessel may be screwed on to its top, thereby locking at the same time automatically, and the bonnet being partly screwed on only, one or two revolutions allowing of its removal by the examiner for the purpose of thoroughly examining the gauze prior to finally screwing it down, thereby automatically locking it, and handing it to the miner for use. After this is done the lamp may be placed to its proper number in the rack, and there is no further necessity for touching it until the miner calls for it to go to work, then the lamp-man takes down the lamp and places it on the firm's patent electric oil-igniting appliance, with a disc arranged for placing the lamp and fitted with the necessary electric contacts for lighting it, when the lamp is immediately lit and handed to the miner, who, by reason of the screw-bonnet and automatic locking arrangement,

is enabled to have his lamp gauze thoroughly tested by the examiner in the manner already described.

It is hardly necessary to suggest the immense saving in time and money effected by the adoption of so complete a system as this, which can, however, be still further augmented by an installation of the firm's apparatus for lighting the lamp in the workings. This has been designed in order that in case a miner loses his light, instead of him having to wait until his lamp is sent to the pit-mouth, or out to the lamp-room to be relit, it can be taken to a lighting appliance stationed in the workings, as may be most convenient, and immediately relighted.

As indicating the wide-spread appreciation in which Messrs. Ackroyd & Best's, Ltd., appliances are held in the mining industry, we append the following list of a few of the leading firms who have adopted the appliances just described: These include the Barrow Hæmatite Steel Co., Ltd., Barnsley; Ackroyd Bros., Ltd., Morley Main Collieries; Cory Brothers & Co., Ltd., Glamorgan; The Ocean Coal Co., Ltd., Glamorgan; Powell Duffryn Steam Coal Co., Ltd., Glamorgan; Toedyrhiw Coal Co., Ltd., Ynysfaio Colliery, Glamorgan; D. Davis & Sons, Ltd., Glamorgan; Tredegar Coal & Iron Co., Ltd., Monmouth; Whitehaven Colliery Company, Cumberland; The Stanton Iron Works Co., Ltd., near Mansfield; Cardiff Steam Coal Collieries Co., Ltd., Llanbradach, Glamorgan; and Lancaster Steam Coal Collieries, Ltd., Cwmtillery, Monmouthshire, and many others in all parts of the kingdom.

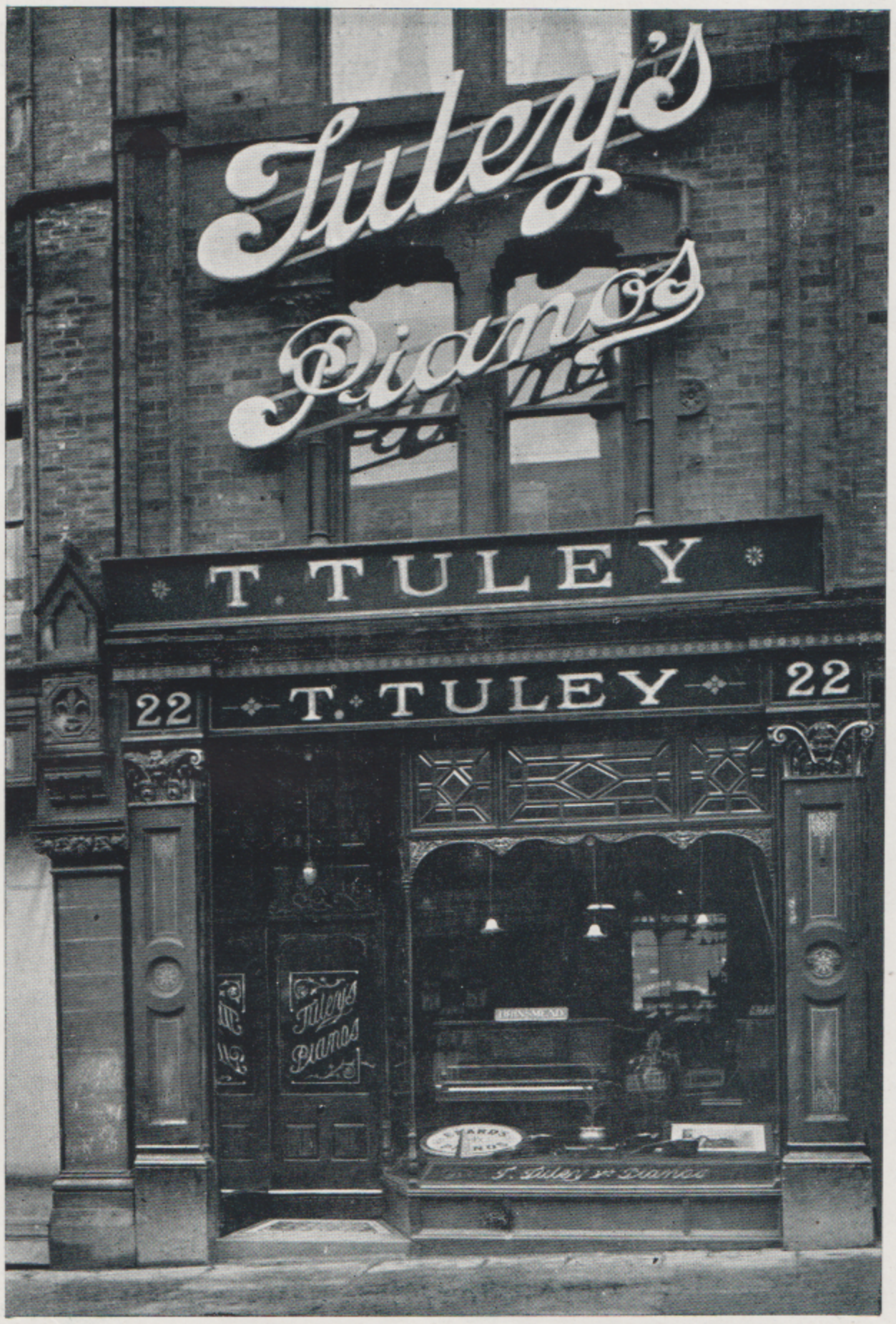
The "Best" Safety Lamp is protected by patents in England, France, Austria, Germany, Belgium and America, and the firm's special appliances have been awarded numerous prize medals and awards, notably, at the Sunderland Exhibition, 1894-5, the Newcastle Exhibition of 1895, and similar distinction at the same place in 1897, diploma and gold medal at the Barnsley Exhibition, 1897, while the most recent success has been at the Paris Exhibition just closed, where they had a stall displaying their various manufactures in the section apportioned to this particular industry.

About three years ago the business was converted into a private limited company, still however, retaining the services of Mr. Ackroyd as Chairman, and Mr. Best as General Manager, and continuing the same enterprising policy that had so largely contributed to the past success of the concern. The premises known as the Hembrigg Lamp Works, are situated in High Street, Morley, and comprise offices and substantial range of buildings for the manufacturing departments. These are admirably arranged and equipped throughout with a complete modern plant of the latest labour-saving tools and machinery for facilitating the output of the goods to which reference has been made. A more recent development of the business has been the opening-up of a department devoted to electrical engineering, and in this connection it may be noted that the establishment is lighted throughout by an excellent installation of the firm's own make, supplementary to the gas formerly in use.

. . MR. T. TULEY . .

WHOLESALE DEALER IN ENGLISH & FOREIGN PIANOFORTES,

Leeds Bridge, LEEDS. .



A FAMILIAR and popular landmark of this part of the city, Mr. Tuley's large and handsome warehouse "under the clock," has long been noted for the superior excellence of the pianofortes, American organs and harmoniums which may be inspected in the show-rooms in attractive designs, the newest models and the leading makes at very reasonable prices. The establishment has an extensive and imposing elevation of four storeys, facing the busy thoroughfare at the end of the old Leeds Bridge in a direct line with Briggate.

The ground floor level forms a fine spacious show-saloon, and extends rearward to a depth of 70 feet to another set of premises five storeys in height, comprising workshops, warehouse, and accommodation for the packing and despatch departments. The premises comprise in all some twenty show-rooms, in which is contained the largest and choicest stock of instruments in the City.

These include the latest models of Broadwood's, Brinsmead's, Kain & Sons' and Schiedmayer of Stutgart's makes, with the most recent improvements in construction, new designs in American organs of which special mention may be made of a very handsome instrument with eleven stops, knee swell and set of pipes in an effective casing marked "Reg. No. 155" on the list.

In other departments are shown reliable second-hand instruments taken in exchange on which full value is allowed, and which offers a wide range of choice to customers of the most modest means, every instrument supplied by Mr. Tuley is fully warranted and kept in tune for a year, a staff of thoroughly experienced hands being regularly engaged for this and repairing work, whose services are available for the execution of orders in town or country.

To those unable to personally visit Mr. Tuley's establishment we would advise an application for the profusely illustrated catalogues issued for the convenience of customers at a distance and completely up-to-date with all the latest designs. A large wholesale connection has been established mostly in the north of England, where Mr. Tuley has gained an widespread reputation for the high standard of excellence of each class of instrument supplied.

THE LEIGH MILLS COMPANY, Ltd.,

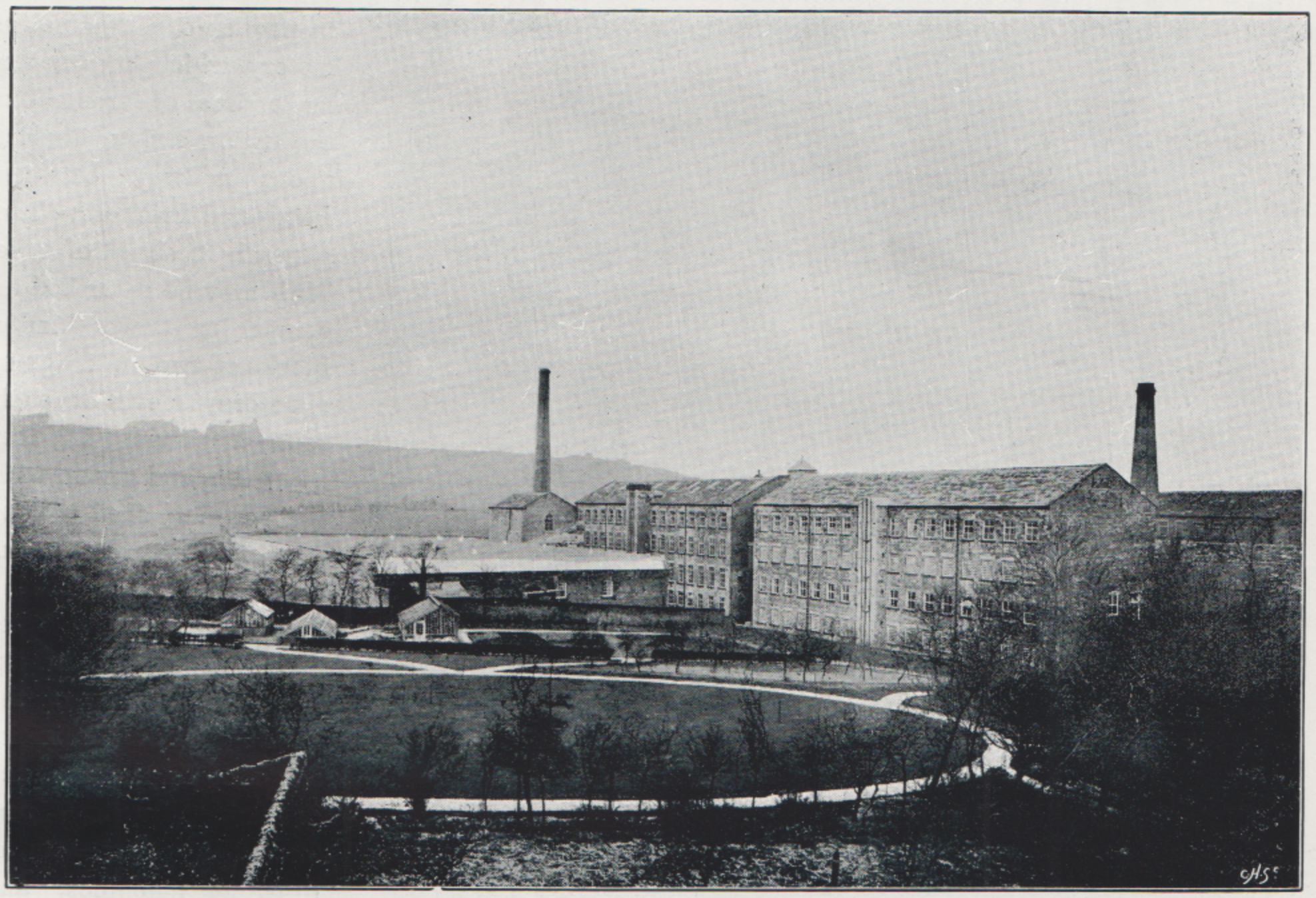
. . The Leigh Mills, . .

STANNINGLEY, near LEEDS.

Chairman: THE RIGHT HON. LORD LEIGH. *Vice-Chairman:* JAMES DARLINGTON, ESQ
Managing Director: R. ILLINGWORTH, ESQ.

London Offices and Show Rooms—18 WATLING STREET, E.C.; 7 MILK STREET, CHEAPSIDE, E.C.; and 4 GOLDEN SQUARE, W.

Agencies—London, Glasgow, Paris, Vienna, Hamburg, New York, Montreal, Sydney, Auckland, and South Africa.



THE LEIGH MILLS, STANNINGLEY.

IN the early sixties, when the textile trades of the country had reached a stage of depression unprecedented in industrial annals, more especially as applied to the silk manufactures of Covenry, a movement was set on foot in that town, initiated by Lord Leigh, of Stonleigh Abbey, and a few fellow philanthropists, to provide work for the numbers thrown out of employment, and in 1863 this movement took practical shape in the establishment of the Leigh Mills in that locality, named after the noble founder. Worked on thoroughly practical lines, and producing an exceptionally high standard quality of goods, the enterprise proved successful beyond the most hopeful anticipations of its promoters, and in course of time it became imperatively necessary to provide auxiliary accommodation

for its steady expansion. This was consequently accompanied by the Leigh Mills Company, Limited, leasing the Mills at Stanningley, formerly known as Varley Mills. This concern had been occupied for many years previously by the late Samuel Varley, after whose death the premises remained vacant for a long period until leased by the Company in 1896.

Upon taking possession of the factory, the buildings were thoroughly renovated and organised to meet the requirements of the business, and are now one of the most completely equipped and efficiently arranged establishments in the trade.

THE LEIGH MILLS' LONDON AGENCY.

By the courteous permission of the manager, our representative was accorded facilities for an inspection of the immense factory which occupies a large area of ground in the Stanningley district about midway between Leeds and Bradford. The general design of the Mills may be described as comprising two large blocks of two buildings of six storeys elevation, each room measuring 143 feet by 45 feet, and giving with the weaving shed a floor area of some acres in extent. The wool, of the finest quality only, after being combed, is transferred to the top of the building where the initial stages of preparation such as mixing, drawing—performed by four sets of drawing machines, and spinning, doubling, warping, warp-dressing, twisting, are carried out in the descent of the raw material thrcugh the intervening floors. The final process of weaving is carried on in the shed on the ground floor, a building of large extent, lighted entirely by electricity and driven by rope driving. By this system of manufacture the greatest economy is effected by the avoidance of re-conveyance of the material at any of the stages named, while it also allows of constant supervision in the processes themselves. The Company also make all their own worsted thread in colours and coloured mixtures of the highest quality, the silk, mohair, alpaca and cotton being obtained from outside sources.

Among the many features of interest presented in the establishment when going through the various departments were the taking-in room where every piece is subjected to the most careful and critical examination for faults and blemishes, and the ware rooms on an upper floor in which we had an opportunity of inspecting some beautiful specimens of the Company's manufactures in serges and plain and fancy dress goods and costume cloths, materials for blouses, skirtings, linings and other fabrics principally for ladies' wear. The output of the Coventry Mills is entirely the manufacture of high class coatings and trouserings, in a great variety of patterns, a staff of designers being retained at both establishments for the production of new and original designs, the yarns being spun at Stanningley.

LORD LEIGH.

In another department we witnessed a scene of busy activity in the packing and despatch of orders, which were being made up for delivery in all parts of the United Kingdom. The plant installed in the mills comprises 6,000 spindles and 300 looms besides pattern looms, the number of hands employed at Stanningley being four or five hundred. Motive power for the machinery is derived from a splendid steam engine laid down by Buckley & Taylor of 500 horse power indicated, considered one of the finest in Yorkshire. It is fitted with all the latest improvements including a Moscrop recorder for indicating the number of revolutions, driving wheel 20 feet in diameter weighing 20 tons, and drives thirteen ropes connected with the plant in various parts of the mill. It also actuates the dynamos for the electric installation of 1,000 lamps lighting the whole of the floors. Each of these is also furnished with Noble Brown & Co.'s patent fire pumps and buckets, as precaution against an outbreak in any part of the building. The Stanningley Mills are connected by telephone with both Coventry and Bradford establishments, and the system is also extended to the various departments. One of the most pleasurable impressions of our visit was the care and consideration extended by the Company to their employees of every grade, neither pains nor expense being spared to ensure the comfort of the hands. For example there is a spacious building fitted with cooking and heating appliances where meals may be prepared or warmed, and a male attendant in charge of the lodge supplies tea and coffee at almost a nominal price. In another building accommodation is provided for smokers during meal times, a practice of course strictly prohibited on the premises except in this apartment.

The manufactures of the Leigh Mills Company as suggested in our comprehensive head lines find channels of distribution in London and all the principal towns of the Kingdom, while the foreign agencies includes the chief centres of the Continent, America, the British Colonies and wherever in fact our commercial relations have been extended to other countries abroad. The administration of the vast business is under the capable control of Rochester Illingworth, Esq., the Managing Director, assisted in the several departments by a competent and efficient staff whose loyal service to the Company is significantly expressed by the magnificent developement of the Leigh Mills industry both at head-quarters and in its numerous branch establishments.

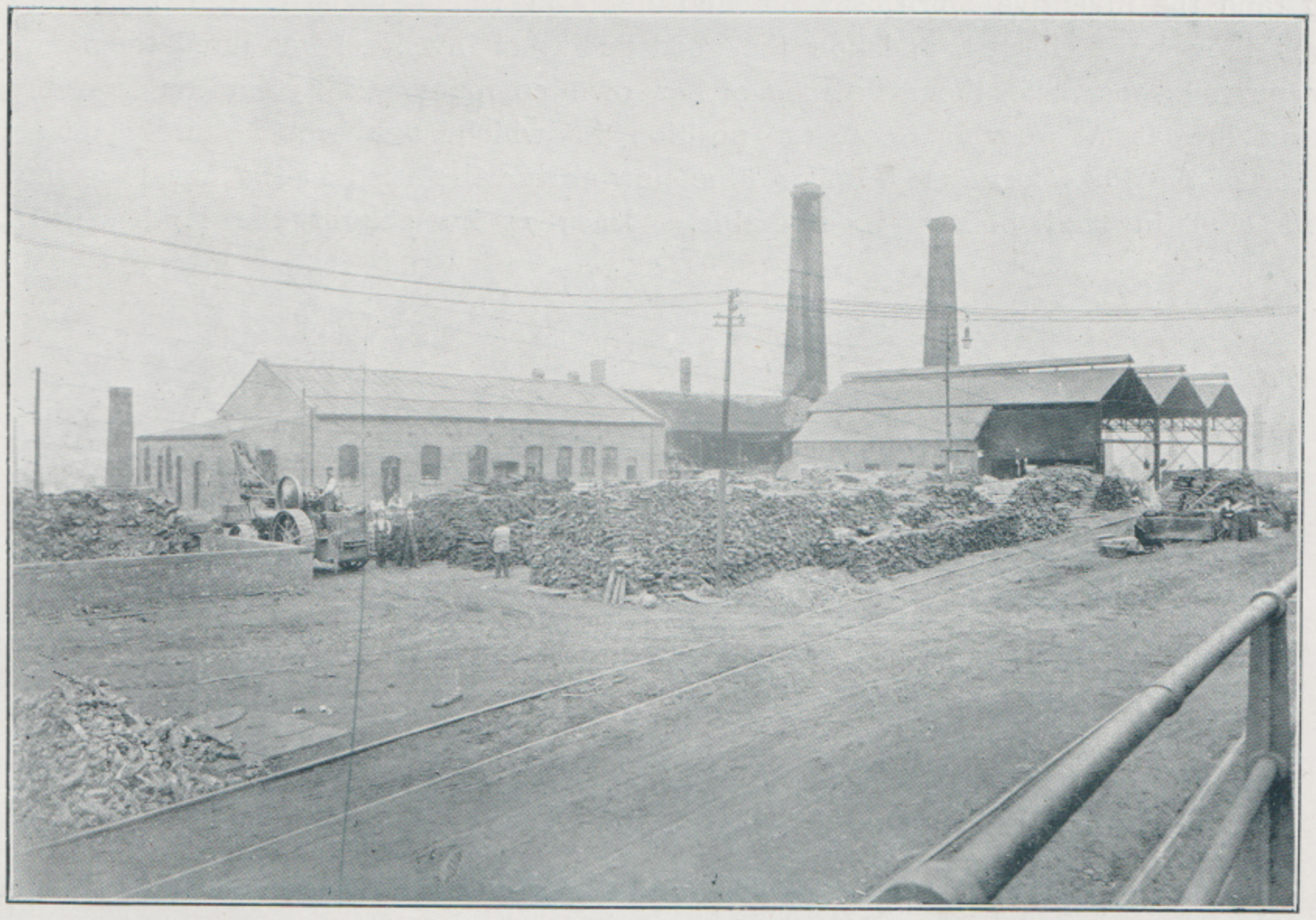
The LEEDS FORGE COMPANY, Ltd.,

. . . LEEDS . . .

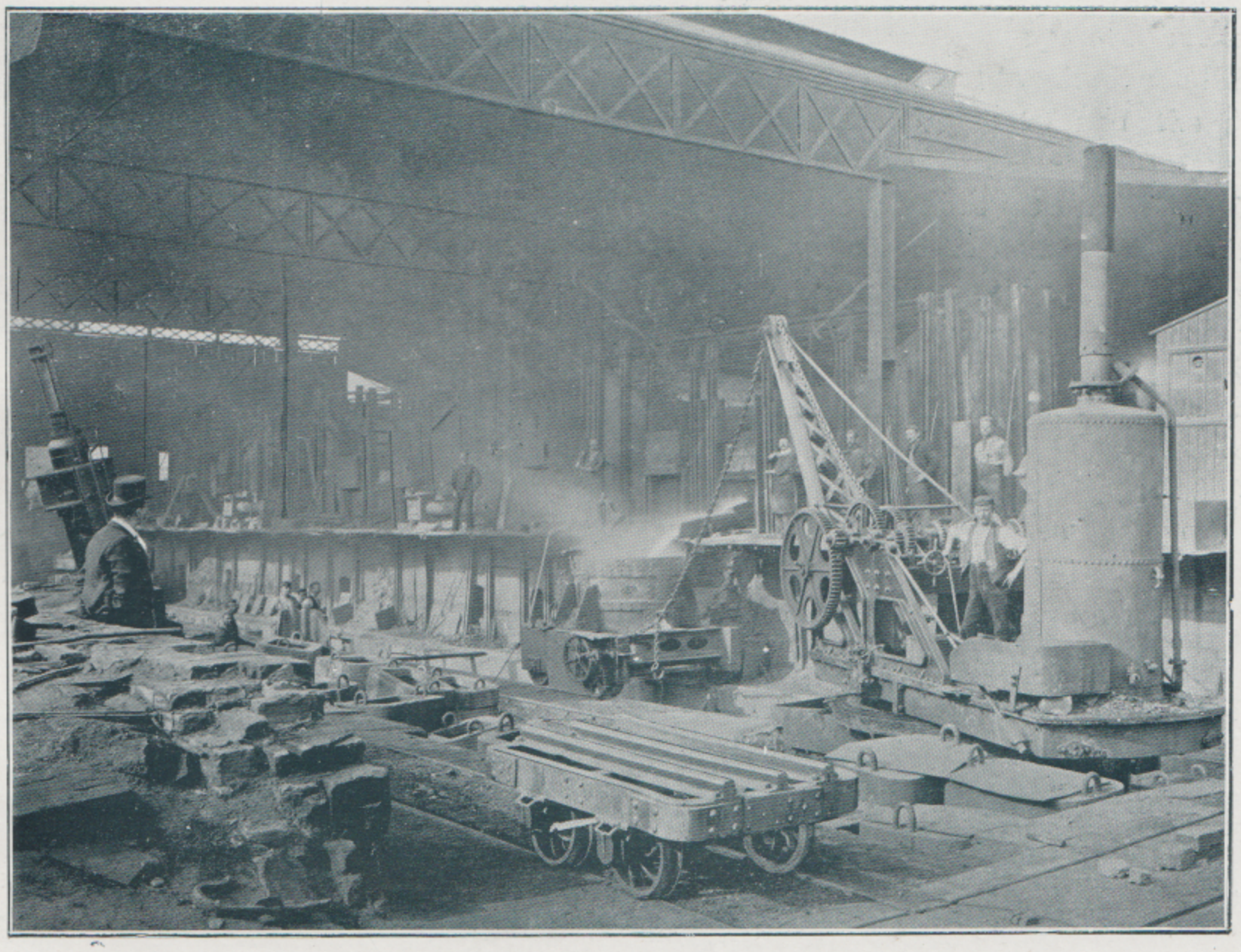
STEAM, it must be admitted, is the great wealth producer, and the best servant of our modern world. Men of letters, without any suspicion of being *laudatores temporis acti*, looking back on the intellectual giants of the past—a Homer or a Shakespeare—may deplore the poverty of our own times, still the compensation is obvious enough for all that. Against the great names of the past we can set with confidence and pride those of Newcomen, Watt and Stephenson, the pioneers of steam power, and modern achievements. It is a vast claim to make, doubtless, and will be grudingly admitted, but the proof is obvious. True, there are few statues to these men in squares and boulevards, and no orator has been found to speak their panegyric. Nor is it needed. On every sea and in every land steam is their apologist, and of them we may say with surpassing emphasis, "*Si monumentum requiris, circumspice.*" Many kindred spirits have continued and elaborated the work which these men began, till now steam engineering is not only the great promoter of industry, but is itself one of our greatest and most important industries.

MR. SAMSON FOX, C.E., J.P.

In this connection, the famous Leeds Forge, founded 1874 by Mr. Samson Fox, C.E., has undoubtedly great claims to distinction, though its operations and reputation are by no means limited to steam engineering. Anyone familiar with the lives of our great engineers will



RAW MATERIAL—PIG IRON, ETC.

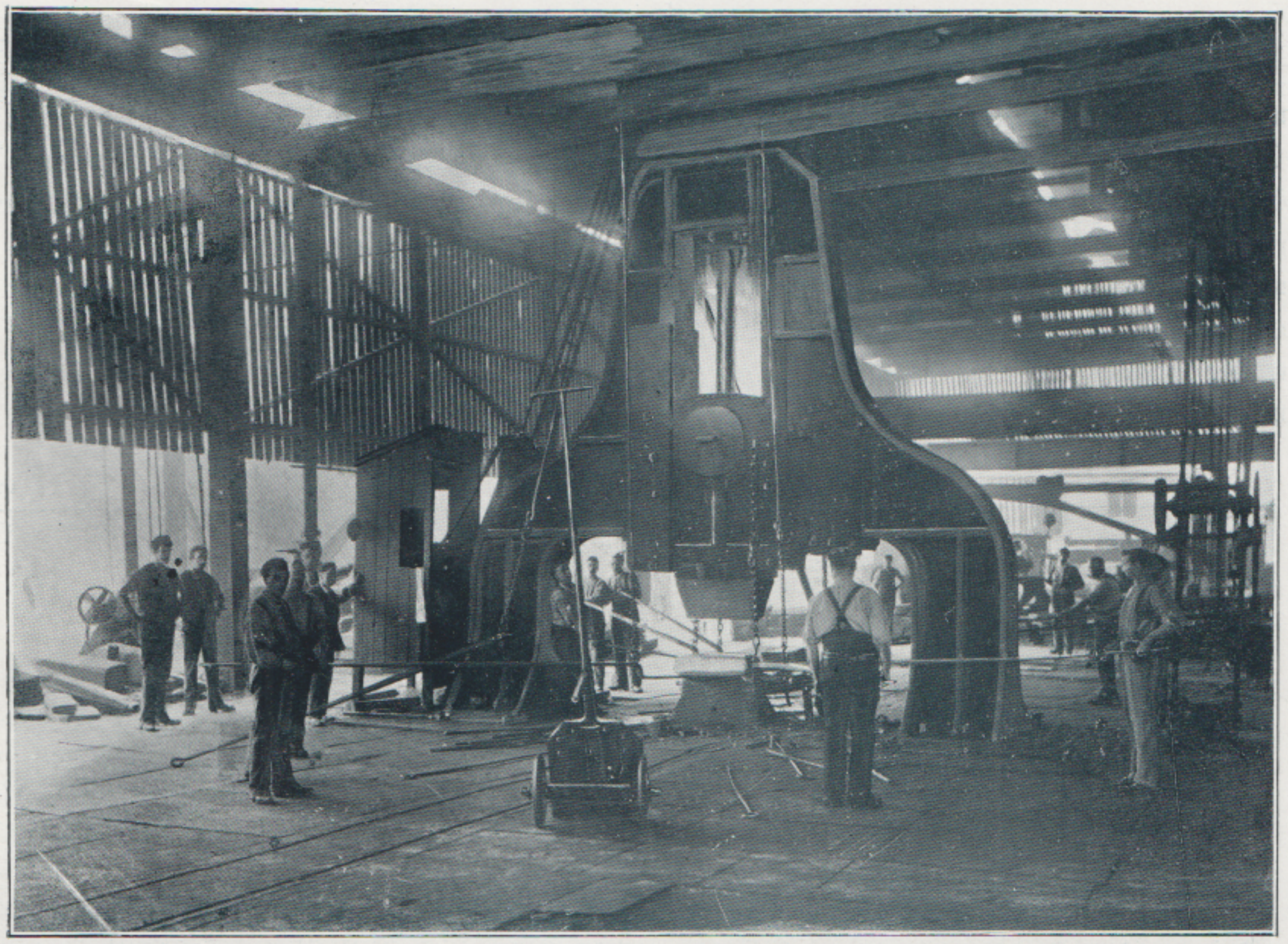


CASTING STEEL INGOTS—THE RAW MATERIAL.

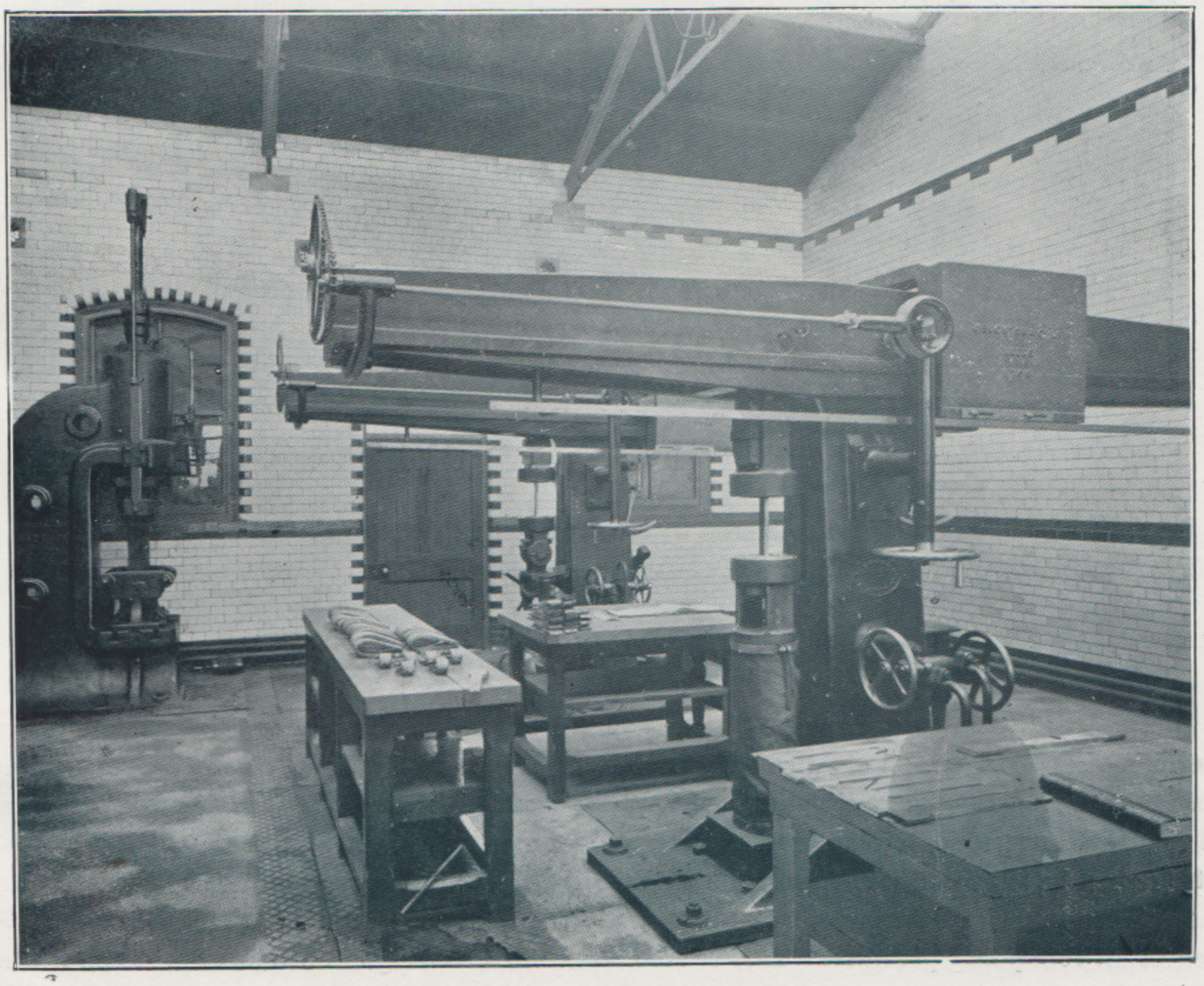
understand the inventive spirit, insight and heroism which underlie the beneficient innovations they have effected, and how the good genius of invention has lured them away from other pursuits to make them freemen of her own company. Mr. Samson Fox began his working life at a weaving loom, a position in which one would hardly look for the inventor of the Fox Corrugated Boiler Flue, now universally used in the naval and mercantile marine, and in land boilers innumerable. In 1874 he bought the land which is now

THE LABORATORY.

covered by the Leeds Forge Company's Works, and commenced the manufacture of Yorkshire Iron. In 1877 he patented what is now known as the Fox Corrugated Flue, and thus laid the foundation of a great industry. Soon after commencing the manufacture of the Fox Furnace he was joined by Mr. John Scott, C.B., and Mr. Sinclair Scott, of the well-known firm of Scott & Company, of Greenock, who have taken an active interest in the affairs of the Company. Mr. John Scott has been Chairman and Mr. Sinclair Scott a Director for many years. In the late eighties the Company commenced the manufacture of Pressed Steel Underframes and Bogies, for Railway Rolling Stock, and this branch of the business has developed to such an extent that it now forms the principal manufacture.



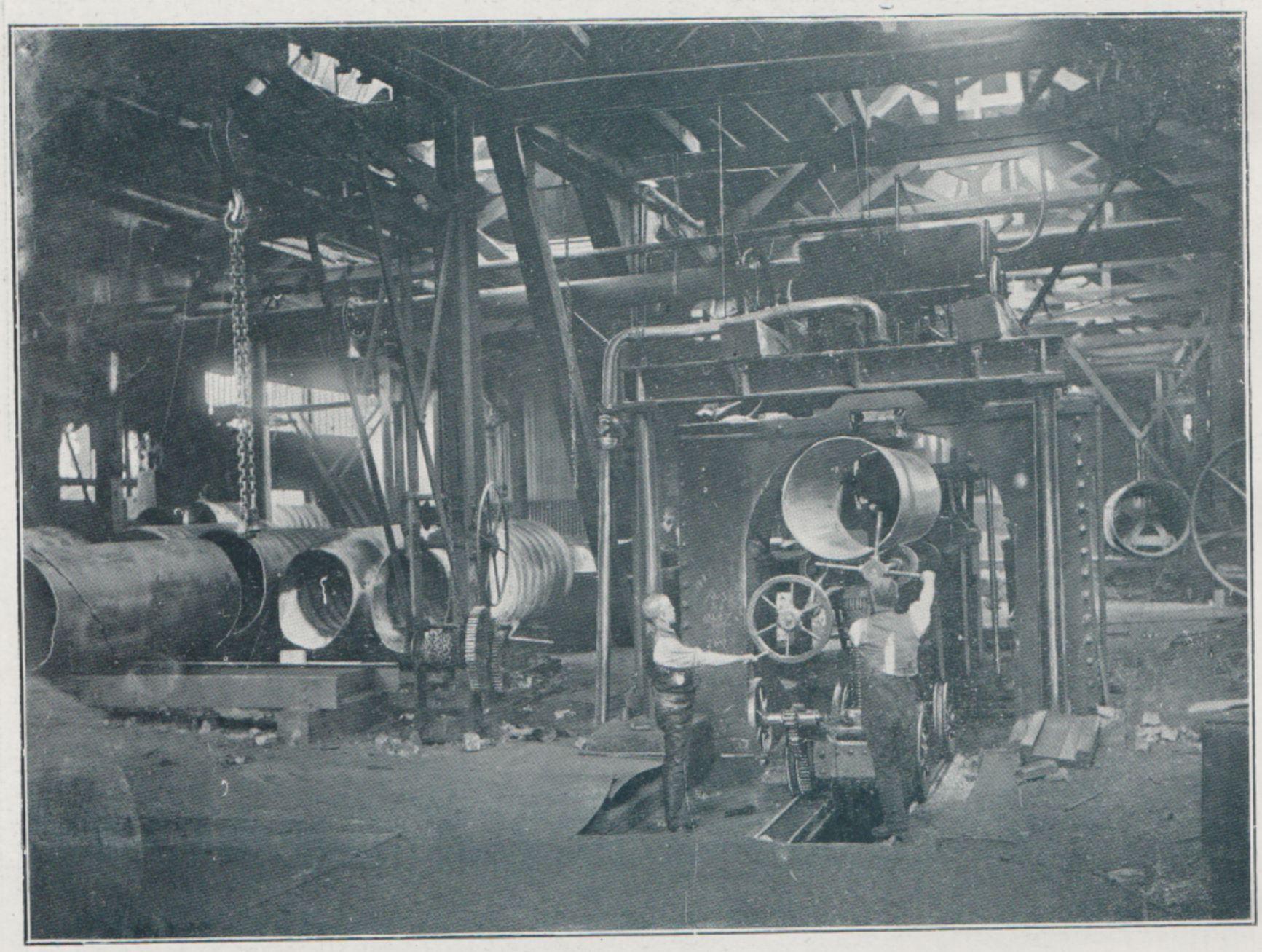
FORGING A STEEL SLAB UNDER STEAM HAMMER.



THE TESTING DEPARTMENT.

THE WORKS

extend for a great distance alongside the canal, and form a vast establishment, the tour of which is no light undertaking. Needless to say, there are many visitors to the works, the fame of the establishment being widespread, and many of its operations unique. The new works dealing with rolling stock consist mainly of a single large building, covering a space of some acres. This and indeed most of the shops is of a single lofty storey, in many bays, lighted from the roof, and the offices are conveniently situated, so that all parts of the works can be reached with equal facility. The whole forms a striking industrial colony, whose mere extent can hardly fail to impress the visitor. The special and powerful plant at work throughout will still more incite his wonder, for

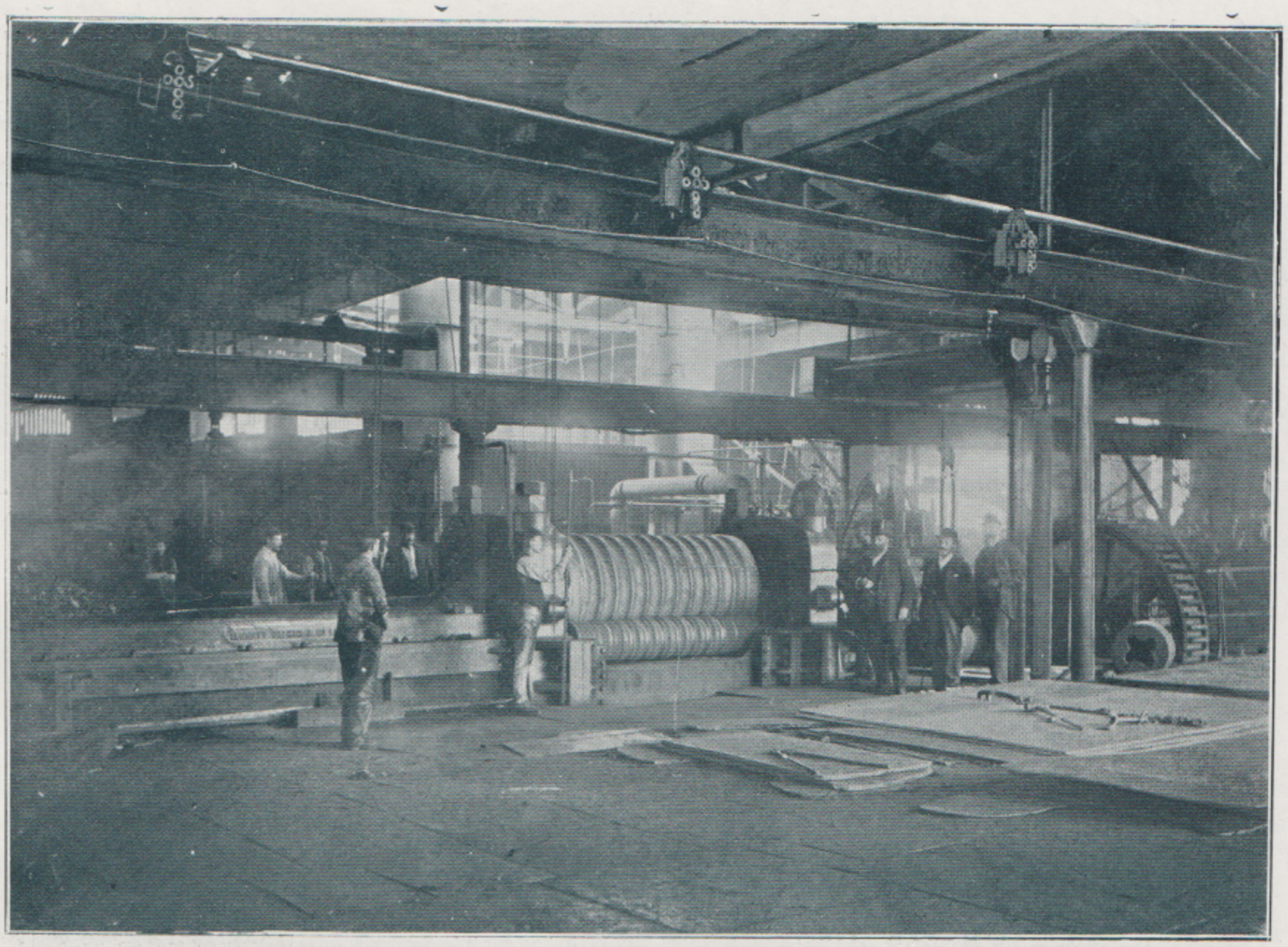


WELDING A PLAIN TUBE BEFORE CORRUGATING.

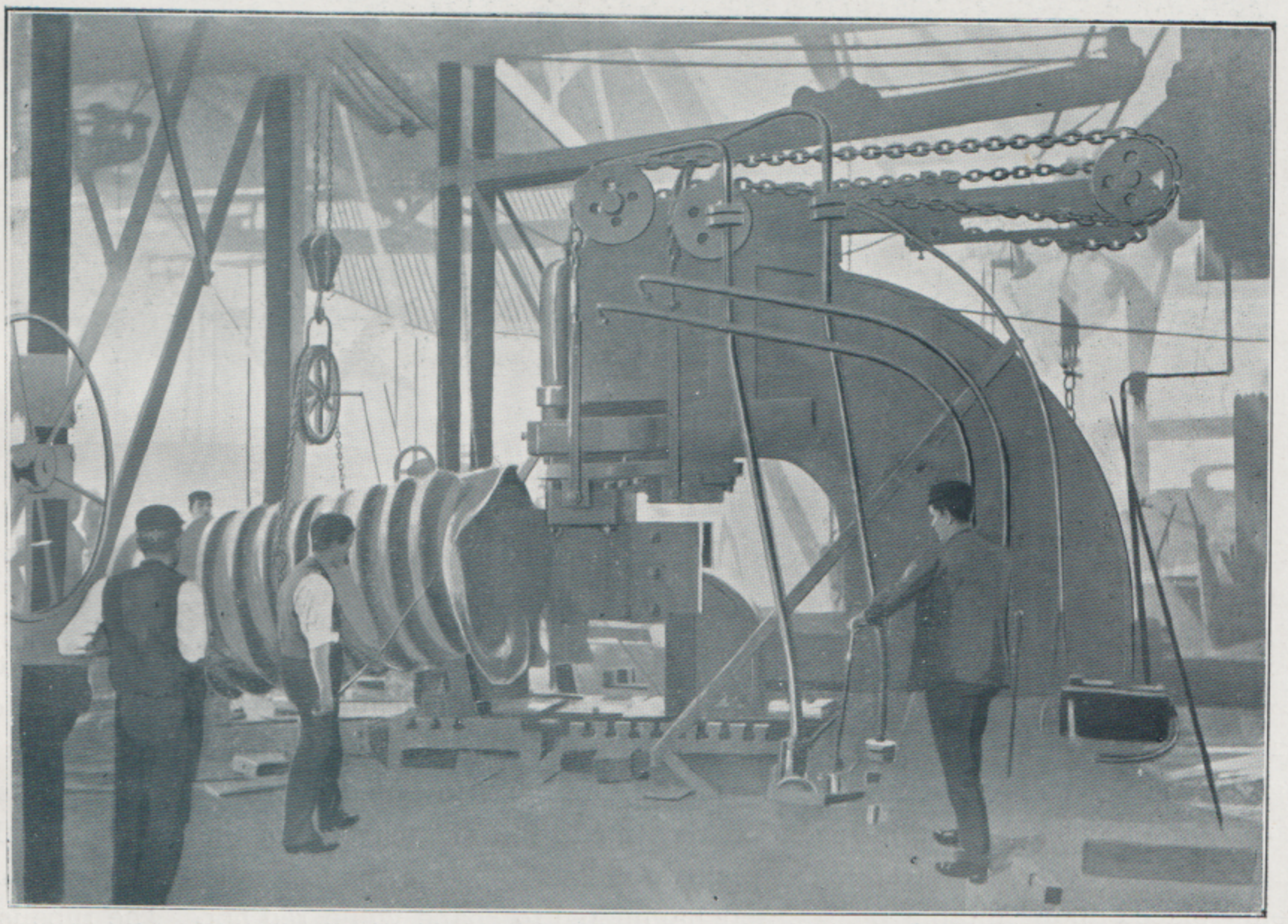
the Leeds Forge is one of those concerns where every possible manufacturing operation is carried out by specially designed machinery of the most modern type.

THE CORRUGATED FURNACES.

These Flues are now so well known that we need not dwell on their many points of superiority. The invention of Mr. Fox many years ago, they had only to be seen to be appreciated by boiler makers and engineers, and were regarded as the standard furnace flue for land and marine boilers for many years. In the first place, Fox's Furnaces give about 15 per cent. more heating surface than the old plain flue, with correspondingly increased steam generative power. Again, the corrugation vastly increased the strength of the furnace to resist an external collapsing pressure. This offered a double advantage in economical steam raising, as



ROLLING A MORISON SUSPENSION FURNACE IN A FOX CORRUGATING MILL.



HYDRAULICALLY FLANGING A FURNACE.

it was found that a corrugated furnace would give a much higher pressure than a plain flue of equal thickness, while being more efficient as a steam raiser. The corrugated form, too, was elastic to some degree, forming a perfect tie for the boiler ends without that rigidity which under great variations of temperature might cause distortion of the flue or the end plates of the boiler. The special manufacturing methods and resources of the Leeds Forge give these furnace flues other points of excellence.

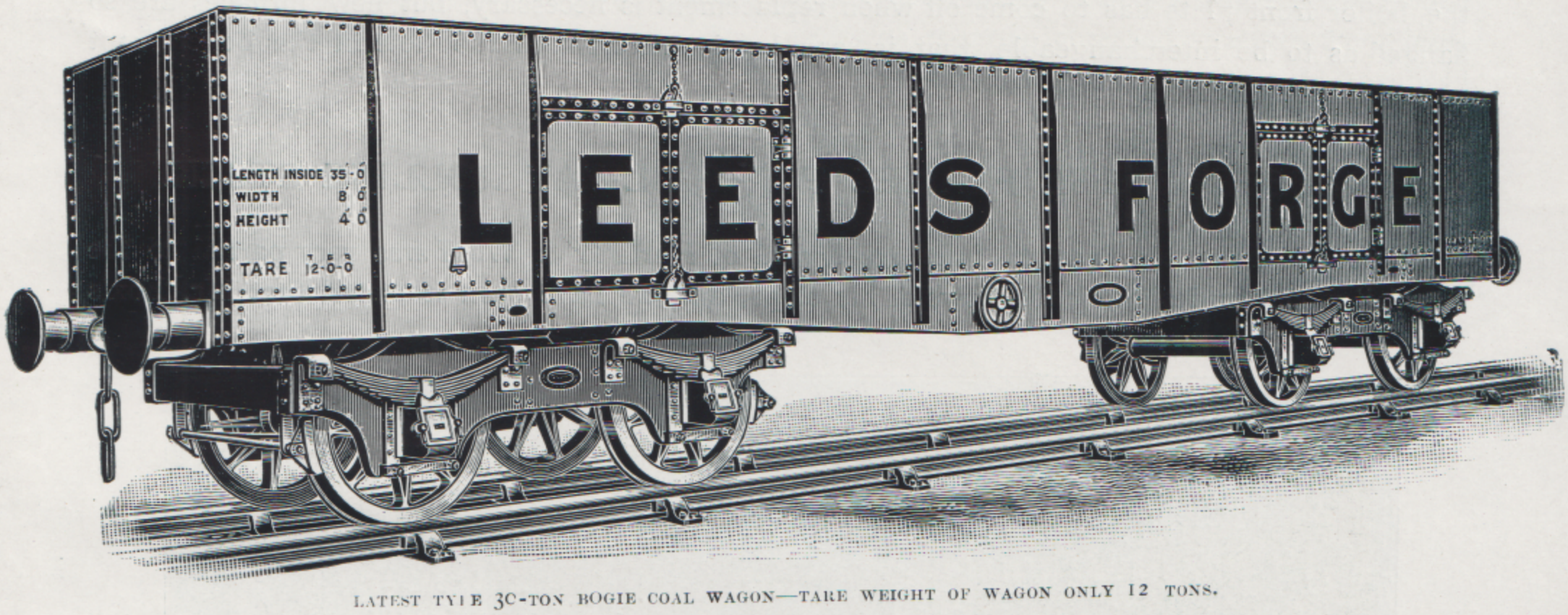
Closely akin to the Fox Corrugated Furnaces are the Morison Suspension Furnaces, another speciality of the Leeds Forge, which have rapidly superceded the Fox type. The Morison type is ridged rather than corrugated, and is the strongest furnace known. It was used by the British Admiralty and Foreign Governments for war vessels until the advent of the Water Tube Boiler, which now forms the subject of so much controversy, and it has been widely

TWO 30-TON BOGIE WAGONS ON CURVE OF 80-FT. RADIUS.

adopted and is now generally used by the Mercantile Marine all over the world. The last new White Star Liner—the s.s. "Oceanic" is fitted with 96 furnaces of the Morison section.

The process of manufacture is highly interesting. The plate from which a furnace is to be made is bent in the form of a cylinder and welded by special machinery. The next operation is he crucial one of corrugating, which is done in a powerful mill of massive size, driven by a pair of engines of 1000 horse-power. The corrugating mill was invented by Mr. Fox at the outset of his career, and indeed it was this invention that made the manufacture of the corrugated flue a practical success, as previous to this the plain tube had to be corrugated under a steam hammer by being placed upon suitable blocks, and hammered to shape while red hot. The tube is now brought to a bright red heat before being placed in the corrugating rolls, and a single revolution

completes the corrugating operation, one or two further revolution being given as a finish. After leaving the rolls, the now corrugated tube goes to the hydraulic presses to be flanged to the



LATEST TYPE 30-TON BOGIE COAL WAGON—TARE WEIGHT OF WAGON ONLY 12 TONS.

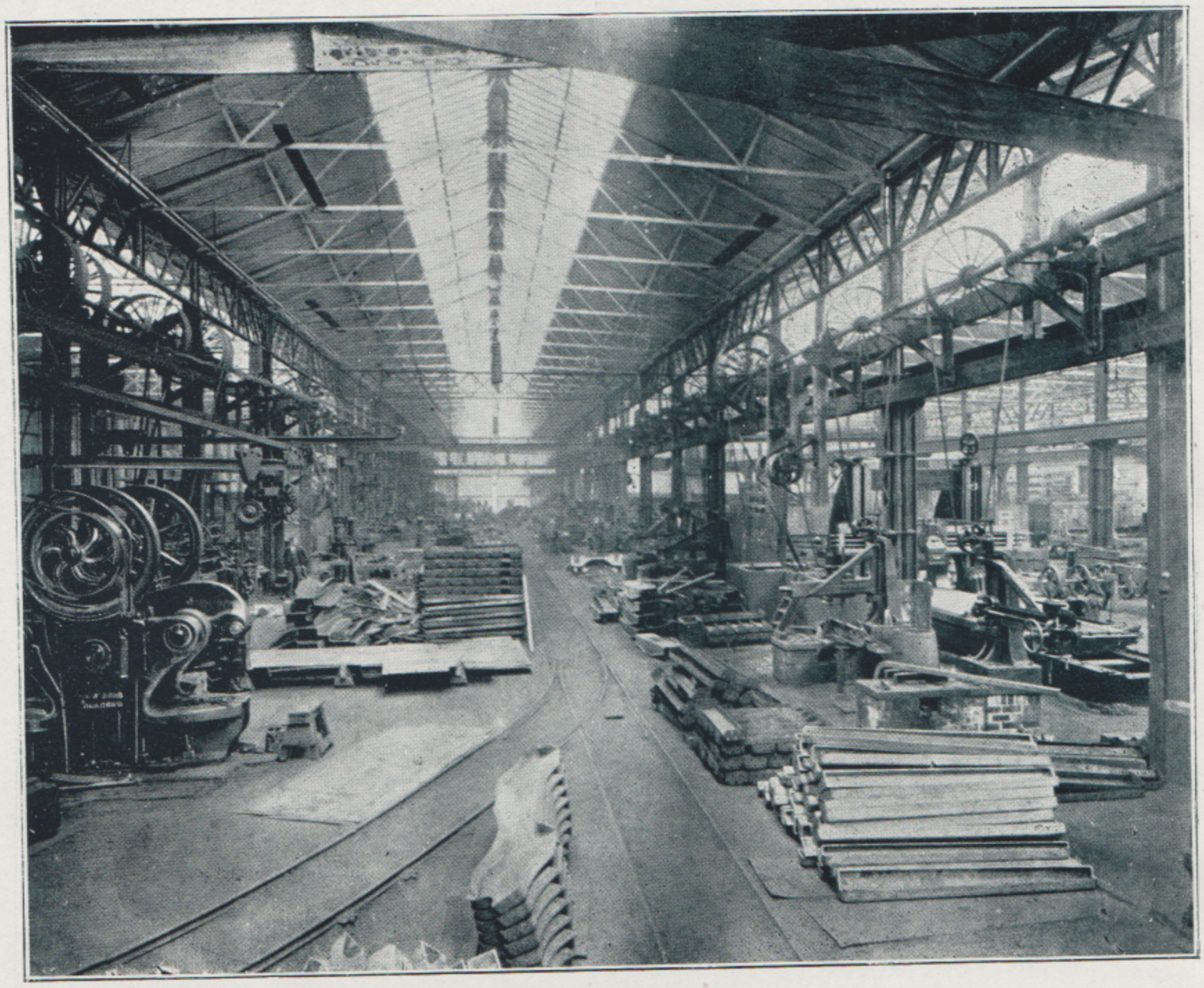
various designs which are specified. The furnaces are rolled to standard pitch and depth of corrugation, and duplicates can always be supplied, when from age or accident new furnaces have to be put in.

FLANGING PRESSES IN PRESSED FRAME DEPARTMENT.

A further advance in the manufacture of the Leeds Forge Furnaces has lately been made, which will no doubt be widely appreciated by boiler makers. With the ordinary flanged furnace the boiler front plate has to come off when replacement is necessary, but new furnaces are so flanged as to be interchangeable, that is, can be drawn through the hole in the boiler front plate without disturbing it.

PRESSED STEEL FRAMES FOR RAILWAY ROLLING STOCK.

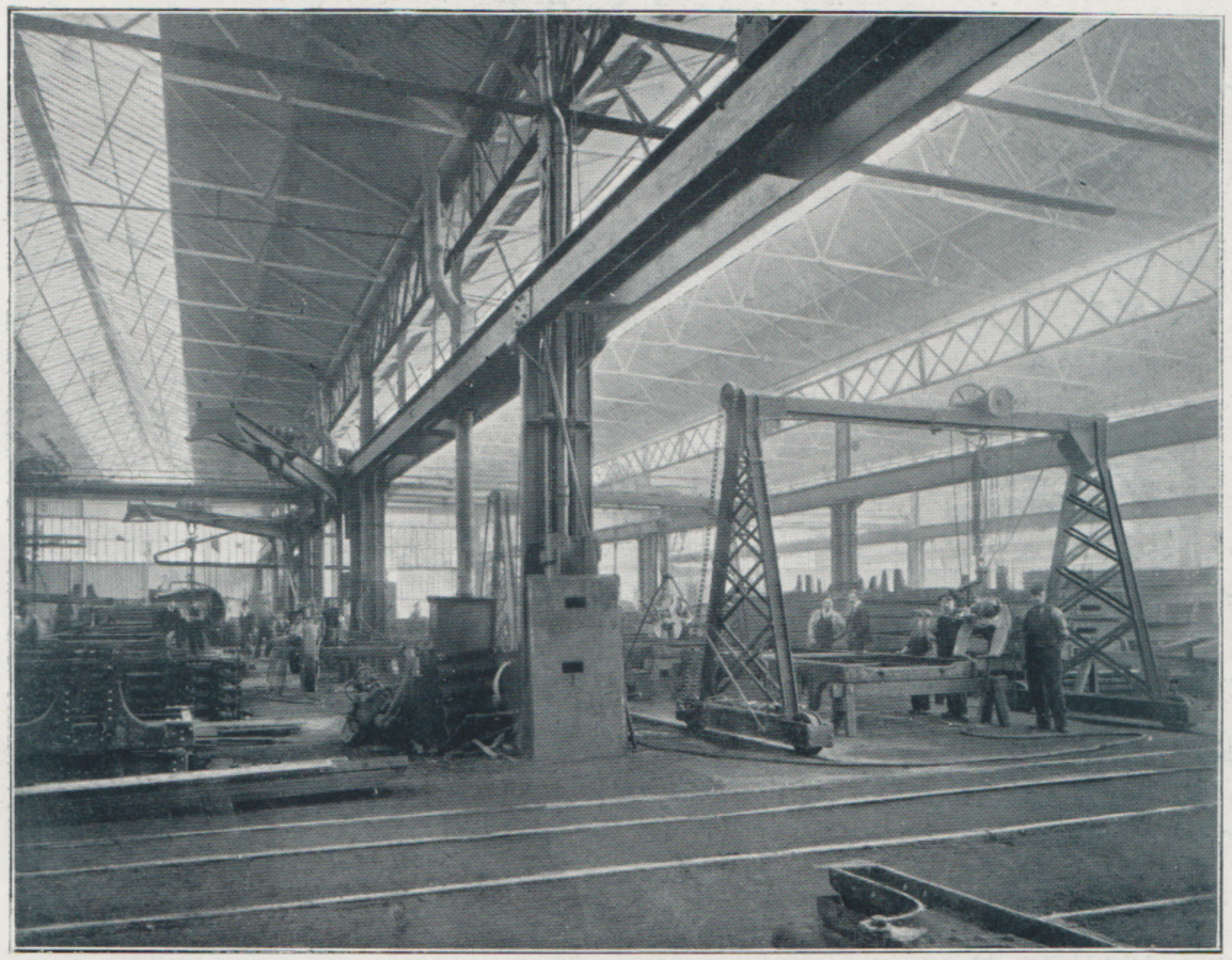
It is said that the founder of the great yard of Harland & Wolff was very partial to the "duck" model in designing the bows of his ships, and we have seen it stated that Mr. Fox's



DRILLING MACHINES.—PRESSED FRAME DEPARTMENT.

first efforts to lessen the weight of rolling stock had their origin in noticing that a very light bicycle could carry a man many times its weight with perfect safety. Now a railway truck weighing 6 tons reminds all and sundry in plain English that its utmost duty is to "carry 8 tons," a limit not generally reached, we need not say to the chagrin of railway directors and engineers, whose expensive locomotives have to haul much truck and little freight. To lower the dead weight of rolling stock would save coal at any rate, and that that could not be done under the wood and-iron system without weakening wagon and coach, was plain enough. Very naturally Mr. Fox turned instinctively to his well-tried material steel. The use of the metal was by no means novel. The novelty lay in the mode of manipulating it so as to form underframes and bogie frames which should be at once the lightest and strongest it was possible to make. Without going into

technical details we may say that the problem was solved with characteristic thoroughness worthy of one who knew the art of manipulating steel plates. The various parts of the frame were pressed into shape, ready for riveting together without the aid of heavy angle pieces which would so materially increase the weight. The results as regards increased strength were more than flattering. Some of the tests recorded are striking, and the ideal of the bicycle has been fully achieved, as will be seen by reference to the illustration on page 13, shewing a wagon the tare weight of which is 4 tons, carrying a test load of 40 tons. In ordinary use this wagon carries 16 tons, or four times its own weight, which is about equivalent to the bicycle, but in the designing of railway wagons much greater difficulties have to be contended with than is the case with the cycle manufacturer, for in the former the wagons must be capable of withstanding the shocks of buffing, and moreover the overall height and width of the wagon must not exceed what



HYDRAULIC RIVETTING MACHINES.

is known as the "running gauge" of the country, or particular railway for which they are required. The cycle manufacturer however is not handicapped in this way, and has simply to design his bicycle to carry the weight of a man.

The use of bogie wagons of large carrying capacity combined with low tare weight is now a subject of consideration with the Railway Companies of the United Kingdom, in view of the success that has attended their adoption in our Colonies and America, and in this direction the Leeds Forge Company have achieved some remarkable results. The bogie wagon illustrated on page 8, has a nett capacity of rather more than 1200 cubic feet, and carries 30 tons of coal, whilst the weight of the wagon itself is only 12 tons; in this case the paying load or weight carried is $2\frac{1}{2}$ times the tare weight of the wagon, or non-paying load, whereas the ordinary four-wheeled timber

built wagons (which have hitherto been used in this country) carry very little more than their own weight, so that by the general adoption of pressed steel frames and bogie wagons of high capacity, the conditions will be reversed, and the locomotives will haul much freight and little truck, thereby reducing very largely the working expenses of the Railway Companies. Moreover these special wagons are only about one half the length of their equivalent in four-wheeled 8 ton wagons, which is another very important feature as it means a large saving in siding accommodation, as well as in the length of trains, and it is surprising the way in which they pass round curves as small as 80 feet radius. The photograph on page 7 shews two of these wagons standing on such a curve, which they traverse with the greatest ease.

Bogie frames, or under trucks, of the standard four-wheeled type, are supplied in large numbers to all the principal railways, and many of the carriages attached to our fastest

ERECTING SHOP—PRESSED FRAME DEPARTMENT.

passenger trains are carried by two of Fox's bogie frames as illustrated, all of which are made by our friends at Leeds. These bogies are used by 34 British Railways.

As regards the pressing of the steel plates into shape, we may say that the machinery in use gives the most perfect results and is a triumph of ingenuity. The blank and finished part are almost of the same weight, hardly any trimming is needed, and there are no weak or faulty parts. All are made to scale and in duplicate, and the work of erection or repair is therefore minimised. Every variety of frame and bogie is made, and the saving of weight is enormous in all.

The accompanying illustrations shew the processes in the manufacture of these Patent Pressed Steel Frames, from the raw materials of pig iron and ore, to the finished article in the shape of wagons passing round the curve out of the shop, and the short description under each view fully explains them.

Without further pursuing the topic, we may say that railway engineers both at home and abroad recognise the great advantage in the use of these pressed steel frames for rolling stock, and without exception that we know of are in favour of them, owing to the absence of repairs on accouut of the small number of parts, connections, and rivets in each frame, and we understand from some of the leading lines that they have had these frames in traffic 10 years without any repairs having been necessary.

THE FOUNDRY.

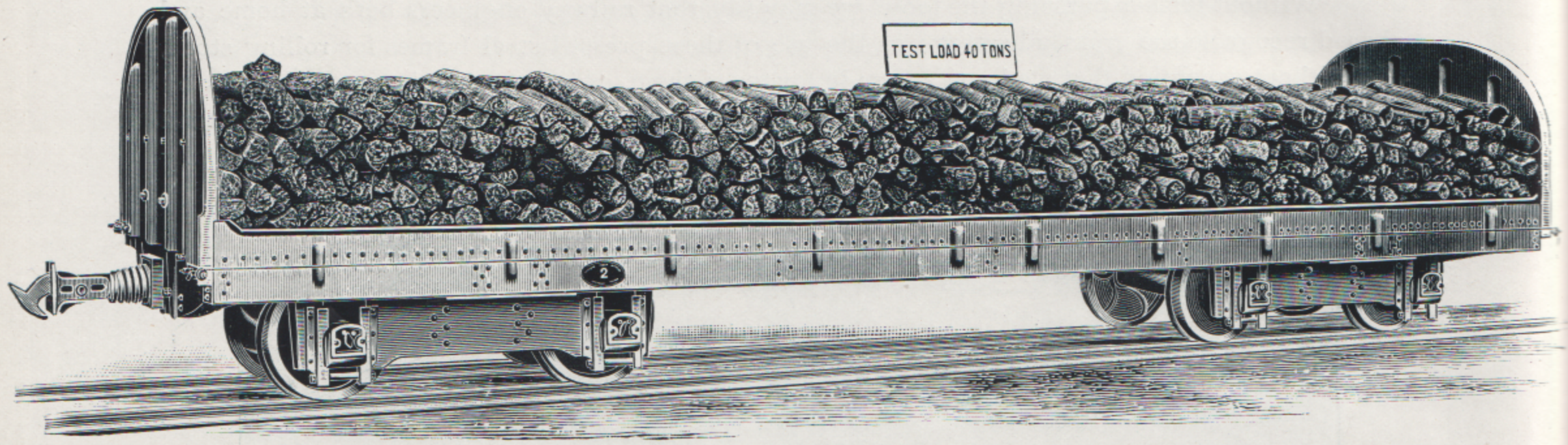
FLANGED PLATES.

The Company make the manufacture of Flanged Plates also a speciality, and these they have supplied, and are supplying in every variety of form for different purposes, but principally in connection with boiler work. In making these plates the use of hydraulic machinery plays a very considerable part, the object being to do away with the many re-heatings necessary when the work is done by hand.

FLAT PLATES.

Last, but not least, we may mention the fact that the Company roll all their own plates, from Siemens Acid Open-Hearth Steel, produced in their own furnaces from the finest brands of

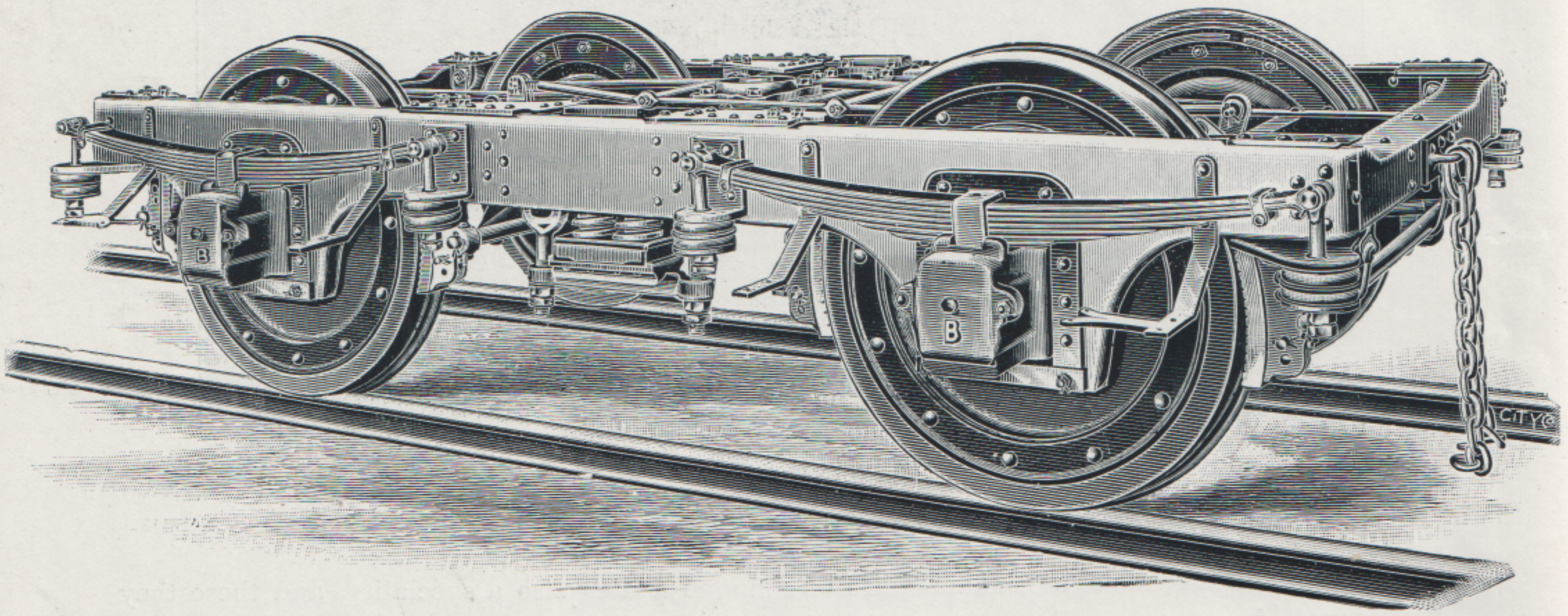
Swedish and Cumberland Hematite Pig Iron and West Coast Ore. They are thus enabled to watch the manufacture from the time the raw material is charged into the steel furnaces until it is handed as a finished plate over to the other departments to be used for the different manufactures, thus ensuring the use of the highest class of the material obtainable.



LOW-SIDED BOGIE WAGON, WEIGHING FOUR TONS, CARRYING A TEST LOAD TEN TIMES ITS OWN WEIGHT.

With the large plant at their disposal the production of flat plates much exceeds their own requirements, and the surplus is in great demand by the various British Railway Companies and boiler and engine builders, to whom its high quality is well known.

The Chemical Laboratory and Testing Department at these works, both of which are shewn in the preceding illustrations, are probably the finest at any manufacturing works in the country,



STANDARD FOUR-WHEELED CARRIAGE BOGIE—4-FT. 8½-IN. GAUGE.

and all the raw materials are analysed, and the rolled steel plates tested, before being used. Samples are also taken from every cast of steel made at the Steel Works, and the results recorded for future reference.

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